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FLORA OF NORTHWEST AMERICA.

CONTAINING
BRIEF DESCRIPTIONS OF ALL THE KNOWN INDIGENOUS AND
NATURALIZED PLANTS GROWING WITHOUT CULTIVATION
NORTH OF CALIFORNIA, WEST OF UTAH, AND SOUTH OF
BRITISH COLUMBIA.

BY
THOMAS HOWELL

Contd
Compositae-387

VOL. I.

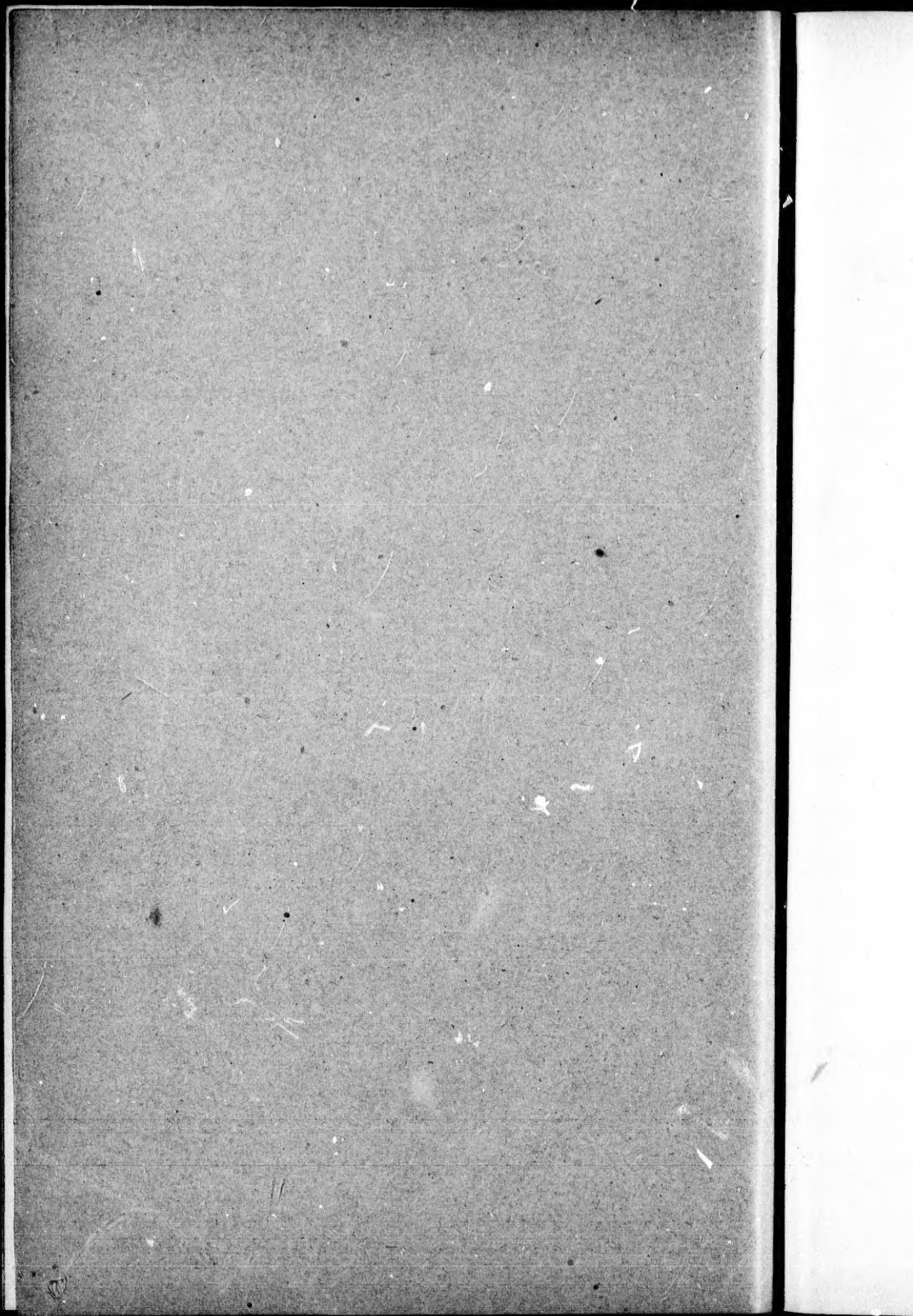
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FASCICLE 4, LIGULIFLOREÆ TO HYDROPHYLLACEÆ

Price Fifty Cents.

PORTLAND OREGON,
March 21st, 1901.





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PORTLAND OREGON,
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Entered according to act of Congress in the year 1897 by Thomas Howell
in the office of the Librarian of Congress at Washington.

CICHORIACEAE

- 97 **Hypochoeris**
with or with
+ + + +
mit or upward
pappus of awns
paleaceous base
- 98 **Ptilocalais**
branching an
bristles with
- 99 **Microseris**
pappus of 4-
- 100 **Scorzonella**
roots: pappus
- 101 **Uropappus**
scarious bide
- 102 **Nothocalais**
ceolate silver
- § 3 Pappus
never plumous
- * Receptacle
flowers.
- 103 **Malacothrix**
ciduous, most
- + Achenes
falling quite se
- ++ Beak
- 104 **Apargidium**
achenes colum
brownish, of
- 105 **Hieracium**
striate: papp
single series.
- 106 **Crepis** Ac
white and sof
- 107 **Nabalus** A
pappus of cop
- 108 **Lygodesmia**
copious and u
- ++ Beak of
- 109 **Agoseris**
achenes 10-co
- 110 **Taraxacum**
angled and us
- 111 **Rafinesquia**
slender softly
- + + Leafy-
achenes flatten

- 97 **Hypochaeris** Flowers yellow: pappus a series of fine plumose bristles with or without some naked and shorter outer ones.

+ + + + Receptacle not chaffy: achenes either truncate at summit or upwardly attenuate, yet with no distinct or prolonged beak: pappus of awned or pointed scarious paleæ, or of awns or bristles with paleaceous base, or plumose.

- 98 **Ptilocalais** Perennial herbs with biennial fusiform and more or less branching and leafy stems: pappus of 15-20 white and soft plumose bristles with paleaceous base.

- 99 **Microseris** Annual or perennial herbs with branching leafy stems: pappus of 4-10, usually 5 paleæ tapering into scabrous awns.

- 100 **Scorzonella** Glebrous perennials with leafy stems from fusiform roots: pappus of 5-10 bristles with small paleaceous base.

- 101 **Uropappus** Acaulescent or subcaulescent annuals: pappus of 5 scarious bidentate awn-tipped paleæ.

- 102 **Nothocalais** Acaulescent perennials: pappus of 20-25 linear-lanceolate silvery-white paleæ in 2 or more series.

§ 3 Pappus of capillary bristles scabrous, rarely barbellate, never plumous nor rose-tinted: except in *Rafinesquia*.

* Receptacle with or without some capillary bristles among the flowers.

- 103 **Malacothrix** Achenes terete: pappus soft and white, promptly deciduous, mostly together.

* * * Receptacle naked.

+ Achenes not flattened: pappus persistent, or the bristles tardily falling quite separately.

+ + Beak of the achene none, or a mere attenuation.

- 104 **Apargidium** Heads solitary, terminating simple bractless scapes: achenes columnar, truncate, not tapering at either end: pappus brownish, of soft and rather fragile capillary bristles.

- 105 **Hieracium** Achenes oblong or columnar, mostly 10-ribbed or striate: pappus tawny, of rather rigid scabrous fragile bristles in a single series.

- 106 **Crepis** Achenes from columnar to fusiform, 10-20-costate: pappus white and soft, in 2 or more series.

- 107 **Nabalus** Achenes terete or 4-5-angled, linear-oblong or cylindrical: pappus of copious rather rigid capillary bristles.

- 108 **Lygodesmia** Achenes terete, linear or slender-fusiform: pappus of copious and usually unequal capillary bristles.

+ + Beak of the achene distinct, usually slender: heads always erect.

- 109 **Agoseris** Involucre more or less imbricated in more than 1 series: achenes 10-costate or 10-nerved.

- 110 **Taraxacum** Involucre of a single series: achenes 4- or 5-costate or angled and usually with some intervening nerves.

- 111 **Rafinesquia** Achenes terete, obscurely few-ribbed: pappus of 10-15 slender softly long-plumose bristles.

+ + Leafy-stemmed plants with more or less paniculate heads: achenes flattened: pappus of copious fine and soft capillary bristles.

- 112 *Lactuca* Achenes with a beak or narrowed summit: pappus-bristles falling separately.
- 113 *Sonchus* Achenes without beak or neck: pappus of very soft and fine bristles which fall more or less in connection, and commonly one or two stouter ones that fall separately.

93 LAPSANA L. Gen. n. 919

Erect paniculately branching annual herbs with alternate leaves and small heads of yellow flowers. Involucre nearly cylindric, its principal bracts nearly equal, and with a few exterior small ones at base: Receptacle flat, naked. Rays truncate 5-toothed at the apex. Anther sagittate at base. Style-branches slender. Achenes 20-30-nerved, somewhat flattened, with rounded apex and small areola. Pappus none.

L. communis L. Sp. 811. Stems 1-4 feet high, paniculately branched, glabrous above more or less hispid-pubescent below: lower leaves ovate, repand-dentate, obtuse, thin, pubescent or glabrate, petioled, 2-4 inches long, often with 2-6 lobes on the petiole; the uppermost oblong or lanceolate, sessile, acute, much smaller, mostly entire: heads very numerous, 3-6 lines broad, loosely paniculate: involucre oblong-cylindric, 2-3 lines high of about 8 linear glaucous connate principal bracts and several very small outer ones. Along road-sides and moist places, Oregon and the Eastern States. Naturalized from Europe.

94 CICHORIUM TOURN. L. Gen. n. 921.

Erect branching herbs with alternate and radical leaves and large heads of blue, purple, pink or white flowers panicled or in sessile clusters along the stem. Heads several to many-flowered. Involucre of 2 series of herbaceous bracts with coriaceous or indurated base; the outer somewhat spreading; the inner subtending and partly enclosing the outer achenes. Receptacle flat, naked or slightly fimbriate. Anthers sagittate at base. Style-branches slender, obtusish. Achenes somewhat angled; the broad summit bordered with a crown-like pappus of numerous short and blunt paleæ in 2 or more series.

C. intybus L. Sp. 813 (CHICORY) Perennial from a long deep taproot: stems 1-3 feet high, with stout, rigid branches, more or less hirsute at least below: radical leaves spatulate in outline, runcinate-pinnatifid, 3-4 inches long, narrowed into long petioles; cauline oblong or lanceolate, commonly dentate, those of the flowering branches mostly reduced and scale-like, subtending solitary or clustered sessile heads, or some heads raised on fistulous peduncles: flowers sky-blue, varying to purple or white, open only at night or in cloudy weather. Roadsides and waste places.

96 PTILORIA Raf. Atl. Journ. 145, 1832.

STEPHANOMERIA Nutt.

Smooth and glabrous herbs with branching or virgate often rigid or rush-like stems, small or scale-like leaves on the flowering branches, and usually paniculate small or middle-sized heads of white to pink flowers that open only at night or on cloudy days. Heads 3-20-flowered. Involucre cylindraceous or oblong, of several appressed and equal plain bracts and some short calyculate

ones, not rare. Receptacle quite naked. Intermediate rays chaffy awns, 1

P. tenuifolia Perennial, 1-2 feet high. Numerous small heads. Runcinate pinnatifid, sometimes runcinate, narrow, usually late scarious-margined. Plains and mountains. Braska,

P. virgata C. Stems rigid, 1-4 feet high. Spatulate, often entire: heads 3-4 lines long. Or thyrsoïdly disseminated. Smaller branches. Involucre 4-8 lines high. Between the narrow and not paleaceous-

P. paniculata Stems erect from narrow 3-5 flowered or else more strictly lower lanceolate long, rugose-tuberculous, its bristles squamelliferous.

P. exigua G. Biennially and often clumps, 1-2 feet high. Diffid, those of the involucre 4-5 lines long. Pinnulate-rugose white dilated and paleaceous. Or 5 phalanges a. California and Texas.

Biennial or perennial. Sessile and clasped. Yellow or purple by noon. Involucres in one series and 5-toothed.

Branches slender. Ribbed, terminating in Pappus-bristles. Plumbe-branched.

T. porrifolium T. Perennial. Feet high from a

ones, not rarely with two or three of intermediate length. Receptacle quite naked. Achenes 5-angled or ribbed, sometimes with intermediate ribs. Pappus a series of plumose bristles or rarely chaffy awns, not rarely naked toward the base.

P. tenuifolia Raf. Atl. Journ. 145, 1832. *Stephanomeria minor* Nutt. Perennial, 1-2 feet high, stems slender, branches ascending bearing numerous small heads of pink flowers in long loose racemes: radical leaves runcinate pinnatifid, those of the stem linear or filiform, entire, or sometimes runcinate-dentate, the uppermost reduced to small scales: involucre narrow, usually 5-flowered with about the same number of linear-lanceolate scarious-margined bracts: pappus white, very plumose to the base. Plains and mountains from British Columbia to California, Texas and Nebraska,

P. virgata Greene Pitt. ii, 130. *Stephanomeria virgata* Benth. Stems rigid, 1-4 feet high from an annual root: lower leaves oblong or spatulate, often sinuate or pinnatifid; upper leaves linear, small and entire: heads 3-4 lines long, mostly sessile or short-peduncled, spicately or thyrsoidly disposed along the naked upper part of the virgate stem or smaller branches, sometimes more loosely paniculate on open branchlets: involucre 4-8 flowered: achenes subclavate or oblong, rugose-tuberculate between the narrow ribs: pappus moderately plumose to the base, white, not paleaceous-dilated. Oregon and California.

P. paniculata Greene l. c. 132. *Stephanomeria paniculata* Nutt. Stems erect from an annual root: a foot or two high, bearing numerous narrow 3-5 flowered heads in an elongated, narrow or more open panicle, or else more strictly disposed or virgate branches: leaves linear or the lower lanceolate: achenes subclavate or oblong, rugose tuberculate or oblong, rugose-tuberculate between the narrow ribs: pappus grayish or fuscous, its bristles short-plumose nearly or quite to the more or less paleaceous or squamelliferous base. Plains of Eastern Oregon and Idaho.

P. exigua Greene l. c. *Stephanomeria exigua* Nutt. Stems paniculately and often divergently branched with slender branches and branchlets, 1-2 feet high: radical and lower cauline leaves pinnatifid or bipinnatifid, those of the branches mainly reduced to short scales: heads scattered: involucre 4-5 lines high, usually 5-flowered: achenes thick-ribbed and tuberculate-rugose when mature: bristles of the pappus 8-18, their more or less dilated and paleaceous or thickened base commonly a little connate into 4 or 5 phalanges and often 1-2-setose on each side. Idaho to eastern California and Texas.

96 TRAGOPOGON L. Gen. n. 905.

Biennial or perennial somewhat succulent herbs with alternate, sessile and clasping leaves, and long-peduncled large heads of yellow or purple flowers opening in the early morning, usually closed by noon. Involucre cylindric or narrowly campanulate, its bracts in one series, nearly equal, united at base. Rays truncate and 5-toothed at the apex. Anthers sagittate at base. Style-branches slender. Achenes linear, terete or 5-angled 5-10-ribbed, terminated by slender beaks, or the outermost beakless. Pappus-bristles in one series, plumose, connate at the base, the plume-branches interwebbed.

T. FORRIFOLIUS L. Sp. 780. (OYSTER PLANT. SALSIFY.) Stems erect, 2-7 feet high from a long fleshy tap-root: leaves entire, linear-lanceolate, long-

acuminate: peduncles very much thickened and hollow for 1-3 inches below the heads: Heads 2-4 inches broad, very showy: bracts of the involucre linear-lanceolate, acuminate usually much longer than the purple rays: achenes sometimes 2 inches long, the outer ones covered with scale-like tubercles especially on the ribs below. Escaped from cultivation.

97 HYPOCHERIS. L. Gen. n. 918.

Mostly perennial herbs with scape-like often branching stems, chiefly radical leaves and large heads of yellow flowers. Involucre campanulate of somewhat herbaceous marginless bracts imbricated in several series. Receptacle paleaceous with soft, narrow and scarious scales among the flowers. Anthers sagittate. Style-branches slender, obtusish. Achenes oblong or fusiform, tapering upward at least the inner ones into a beak. Pappus a series of fine plumose bristles, with or without some naked and shorter outer ones.

H. radicata L. Sp. 811. Stems several together from a perennial root, slender, 1-2 feet high, branched or rarely simple, bearing a few scales, leaves oblanceolate to obovate in outline, pinnatifid-lobed to dentate, 2-6 inches long, hirsute on both sides: involucre oblong-cylindric, about an inch high its bracts glabrous, or sparingly pubescent: achenes rough, all with very slender beaks longer than the body. In waste places, Western Washington to California. Naturalized from Europe.

98 PTILOCALAIS Greene Bull. Cal. Acad. ii, 59.

MICROSERIS § PTILOPHORA Gray.

Glabrous herbs from fusiform biennial roots laciniately cut leaves and middlesized to large heads of yellow flowers. Heads nodding in bud. Involucre campanulate, its bracts imbricated in several series, the inner long-acuminate the outer successively shorter and acute. Receptacle flat, foveolate. Achenes linear-columnar, of the same diameter from base to summit. Pappus bright white, soft, of 15-20 truncate or emarginate paleae terminating in a long, soft-plumose capillary bristle or awn and often with one or more short external merely scabrous bristle.

P. nutans Greene l. c. *Microseris nutans* Gray. Stem slender, 6-18 inches high: roots either fascicled or solitary: leaves from entire and spatulate-obovate to pinnately parted into narrow linear lobes: heads 8-20 flowered, slender-peduncled: involucre cylindraceous, of 8-10 linear-lanceolate gradually acuminate principal bracts and a few short calyculate ones below, bristles of the pappus several times longer than the oblong paleae. In open pine woods, British Columbia to California and Montana.

P. major Greene l. c. *Microseris major* Gray. Stout, often more than 2 feet high: leaves oblong lanceolate, entire or sparingly laciniate involucre sometimes an inch high; its lanceolate bracts imbricated in 3 lengths. Idaho to Utah.

99 MICROSERIS Don Phil. Mag. xi. 388.

Acaulescent glabrous annuals with entire or laciniately lobed or pinnatifid leaves and rather small nodding heads of yellow flowers on slender peduncles. Involucre oblong-cylindraceous to

hemispherical membraneous terete, 8-10 c at the insertion scabrous collar mostly short

M. Douglasii inches high: leaves spatulate, entire of 4-10 oblong, calyculate ones summit, 3 lines abruptly into an

M. Bigelovii ceolate to linear ed into linear l acuminate principal ones at their base truncate summit pappus 5, oblong thrice their length

100 SCO

Glabrous peduncles ately cut leaves are nodding paleaceous, imbricated other shorter alveolate. Achenes striate, truncate expanded, areolate tipped with a calyculate bristle

S. procera Stems robust, 2-3 dentate or entire radical larger: involucre 3 series, the outer lanceolate: achenes narrow paleae with Washington to C

S. pratensis duncles 1-2 feet inches long: heads in 3 series, ovate narrowly lanceolate meadow lands n

S. laciniata Gray Glaucous leaves lacinate cal 4-10 inches long with dilated base

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hemispherical, inner bracts in one or two series, equal, thin, with membranous margins outer, very short. Receptacle flat. Achenes terete, 8-10 costate, with a broad basal callosity which is hollowed at the insertion and produced upward into a sharp denticulate scabrous collar-like rim. Paleæ of the pappus 4-10, usually 5, mostly short and tapering into a long or short scabrous awn.

M. Douglasii Gray Proc. Am. Acad. ix 210. Stems slender, 3-24 inches high: leaves chiefly clustered at the base of the stem, linear to spatulate, entire or sparingly lacinate, 1-5 inches long: involucre oblong of 4-10 oblong, obtuse principal bracts and 3-5 very short erose dentate calyculate ones at base: achenes oblong-turbinate, contracted under the summit, 3 lines long: paleæ of the pappus, ovate, 2 lines long, tapering abruptly into an awn. Southwestern Oregon to California.

M. Bigelovii Gray l. c. Stems slender, 4-12 inches high: leaves lanceolate to linear in outline, entire to laciniately toothed or pinnately parted into linear lobes: involucre campanulate, of 8-10 lanceolate acute or acuminate principal bracts and several smaller obtuse or barely acute ones at their base: achenes oblong-turbinate, not contracted under the truncate summit, 2 lines long, outermost sometimes villous: paleæ of the pappus 5, oblong to lanceolate, gradually tapering to an awn twice or thrice their length. Along the coast, Oregon and California.

100 **SCORZONELLA** Nutt. Trans. Am. Phil. Soc. vii, 426.

MICROSERIS § *SCORZONELLA* Gray.

Glabrous perennial herbs with fusiform biennial roots, laciniately cut leaves and long-peduncled heads of yellow flowers that are nodding in bud. Involucre campanulate, its bracts herbaceous, imbricated in several series, the inner long acuminate, the other shorter and acute. Receptacle flat or convex. foveolate or alveolate. Achenes linear or somewhat turbinate, 8-10-costate or striate, truncate at summit, the basal callosity acute and not expanded, areola lateral. Pappus 5 or 10 ovate or lanceolate paleæ tipped with a generally much longer, straight scabrous or barbellulate bristle or awn.

S. procera Greene Bull. Cal. Acad. ii, 50. *Microseris procera* Gray. Stems robust, 2-3 feet high: leaves chiefly oblong apiculate-acuminate, dentate or entire, rarely lacinate-lobed; larger cauline 6-8 inches long, radical larger: involucre an inch or more high and broad, its bracts in 2 or 3 series, the outer ones ovate, the inner ones ovate-lanceolate, all acuminate: achenes nearly columnar 3 lines long, pappus of 10 brownish lanceolate paleæ with long barbellate awns. Rather common in open places, Washington to California.

S. pratensis Greene l. c. 51. Leafy at base only, the scapose peduncles 1-2 feet high: leaves linear-lanceolate, long-acuminate, entire, 6-12 inches long: heads an inch high and nearly as broad, bracts of the involucre in 3 series, ovate to lanceolate, acuminate: pappus of 10 white or sordid narrowly lanceolate paleæ with long minutely plumose awns. Moist meadow lands near Ashland, Oregon, and Yreka, California.

S. laciniata Nutt. Trans. Am. Phil. Soc. vii, 426. *Microseris laciniata* Gray Glaucous: stems rather stout, leafy and branching, 2-3 feet high: leaves lacinate pinnatifid into attenuate lobes, or sometimes entire; radical 4-10 inches long: involucre an inch or less high, its bracts nearly all with dilated base and more or less abrupt acumination. Achenes columnar,

2 lines long: paleae of the pappus deltoid or triangular-ovate, abruptly tipped with an awn or bristle 8 or 9 times longer. Alluvial grounds, British Columbia to Northern California.

S. leptosepala Nutt. l. c. *Microseris leptosepala* Gray. Stems slender, a foot or so high: leaves from linear to lanceolate and from entire to attenuate-pinnatifid, all attenuate: heads comparatively small and few-flowered; involucre 6-10 lines high, of 6-12 lanceolate acuminate principal bracts and a few small, ovate, abruptly acuminate ones at their base: achenes slender-columnar: paleae of the pappus ovate-lanceolate, or narrower, tapering gradually from the base: into an awn or 4 or 5 times as long. Moist ground, British Columbia to California.

S. Bolanderi Greene l. c. *Microseris Bolanderi* Gray. Stems slender, 1-2 feet high: leaves from narrowly linear-lanceolate to somewhat spatulate, entire or with a few small salient linear lobes. 6-12 inches long: involucre 6-9 lines high, its bracts all gradually lanceolate-attenuate from a broadish base, or some small outermost abruptly acuminate: paleae of the pappus little exceeding the breadth of the achene, broadly ovate, mostly obtuse, tipped by the long slender awn. In swamps near the coast, Washington to California.

S. Howellii Greene l. c. *Microseris Howellii* Gray. A foot or more high from a fusiform root slender bearing solitary or 2 or 3 heads: leaves elongated-linear and attenuate, some bearing a few attenuate reflexed lobes: involucre half-inch high, narrow, 15-20-flowered, its bracts all acuminate; the inner oblong-lanceolate, and all nearly equal; the outer much shorter and mostly ovate achenes 3 lines long, narrower at base: pappus of 8 or 10 conspicuous and firm lanceolate paleae 2-3 lines long, tipped with a denticulate-scarious awn of hardly greater length. Hillsides about Waldo, southeastern Oregon.

101 UROPAPPUS Nutt. l. c. 425.

MICROSERIS § CALAIS Gray.

Subcaulescent annuals with laciniately lobed or pinnatifid leaves and erect heads of yellow flowers on long scape-like strict and erect peduncles which are thickened above. Involucre campanulate, its numerous bracts imbricated in 2 or more series, the outer successively shorter, all thin and scarious margined. Receptacle flat, more or less alveolate-chaffy in the centre. Achenes terete, 8-10-costate, glabrous with scarious costa, the basal callusity not angled. Paleae of the pappus 5, elongated, flat, hispid and short-awned at the apex.

U. linearifolius Nutt. l. c. *Microseris linearifolia* Gray. Scapes or peduncles 6-24 inches high: leaves linear, coarsely few-toothed or pinnatifid, 2-6 inches long, more or less villous-pubescent when young: achenes black, slender, tapering above almost to a beak, 6-8 lines long: paleae of the pappus silvery-white, linear oblong 4-8 lines long, deeply notched above and bearing slender awns barely half their length. Dry hillsides, Brit. Columbia to California and New Mexico.

U. macrochaetus Greene Pitt. iii, 137. *Microseris macrochaeta* Gray. "Scapes or peduncles sometimes 2 feet high: involucre narrow, 8-10 lines high, its bracts attenuate-acuminate: paleae of the pappus thin, small, cleft quite to the middle from the first, bearing a long and weak awn. Southwest Idaho to California."

Aculescent sized erect heads; its bracts with some receptacle flat, or rostrate-awned and soft, of 10 or without some

N. Suksdorfii Greene l. c. *Microseris Suksdorfii* Gray. Stems 1-2 feet high: leaves linear-lanceolate from the crown long-attenuate, filled by the scarious Plains of Klickitat

N. troximoides Greene l. c. *Microseris troximoides* Gray. Stems 6-12 inches high: leaves linear-lanceolate, rather flexible, 6-12 inches long: achenes contracted, near the base below, very unequal in length and Washington

N. cuspidata Greene l. c. *Microseris cuspidata* Gray. Stems shorter than or pubescent or glabrous, their margins quite glabrous, the awn, about 3 lines long, soil, Idaho to I

Leafy-stemmed all radical leaves of yellow or white. Involucre many-angled, calyculate. Achenes among the columnar, glabrous, narrowed either by the denticulate or denticulate scarious, or scarious more or stouter ones

M. glabrata Greene l. c. *Microseris glabrata* Gray. Stems with ascending or bearing yellow flowers: or almost filiform outer bracts

102 NOTHOCALAIS Greene Bull. Cal. Acad. ii, 54.

MICROSERIS A. N. THOCALAIS Gray.

Acaulescent perennial herbs with linear leaves and middle-sized erect heads of yellow flowers. Involucre oblong-campanulate; its bracts in two series, narrowly lanceolate, membranaceous with somewhat thinner hyaline margins, nearly equal. Receptacle flat, alveolate. Achenes fusiform, stipitate, contracted or rostrate-attenuate at summit, 10-costate. Pappus very white and soft, of 10-40 scabrous-margined narrow unequal paleæ with or without some capillary bristles.

N. Suksdorfii Greene l. c. More or less pubescent: scapes 4-10 inches high: leaves linear, attenuate nearly equalling the flowering scapes, all from the crown of a thick perennial root: bracts of the involucre lanceolate, long-attenuate, 6-12 lines long: achenes slender, 5-6 lines long, only half filled by the seed: paleæ of the pappus 10-12 narrow and nearly equal. Plains of Klickitat Co. Washington and adjacent Oregon.

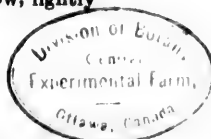
N. troximoides Greene l. c. *Microseris troximoides* Gray. Scapose stems 6-12 inches high: leaves tufted on the crown of a thick perennial root, rather fleshy, narrowly linear-lanceolate, entire or undulate, 4-6 inches long: achenes fusiform, scarcely 4 lines long, its summit merely contracted, nearly filled by the seed: paleæ of the pappus 20-24, lanceolate below, very unequal half-inch long. Plains and hillsides eastern Oregon and Washington to California and Idaho.

N. cuspidata Greene l. c. *Troximon cuspidatum* Pursh. Scapes stout, shorter than or equalling the leaves: leaves linear, long-acuminate, thick, pubescent or glabrate, 4-8 inches long, 2-5 lines wide, somewhat conduplicate, their margins white-tomentose and crisp, or entire: involucre usually quite glabrous, nearly 1 inch high: achenes slightly contracted at the summit, about 3 lines long: pappus of 40-50 unequal paleæ and bristles. Dry soil, Idaho to Illinois.

103 MALACOTHRIX DC. Prodr. vii, 192.

Leafy-stemmed or sometimes scapose herbs with alternate or all radical leaves and long-peduncled, panicle or solitary, heads of yellow or white flowers that are usually nodding in the bud. Involucre many-flowered, its bracts either imbricated or only calyculate. Receptacle with or without delicate capillary bristles among the flowers. Achenes not flattened, short-oblong or columnar, glabrous, terete and striately 5-15-costate, or 4-5-angled by the prominence of the stronger ribs, slightly if at all narrowed either way with broad truncate apex having an entire or denticulate border or sharp edge. Pappus a series of soft and scabrous, or near the base barbellulate, bristles which are deciduous more or less in connection, and commonly 1-8 outer and stouter ones which are more persistent and smoother.

M. glabrata Gray Syn. Fl. i, pt. 2, 422. Subcaulescent annual: erect or with ascending branches from the base, these leafy, often again branching and bearing a few lateral as well as terminal long-peduncled heads of yellow flowers: leaves once or twice laciniately pinnatifid into narrow linear or almost filiform lobes: involucre fully half-inch high, glabrous, or the outer bracts sometimes canescent when young: achenes narrow, lightly



costate: outer pappus of 2 persistent bristles and between them some minute pointed teeth. Eastern Oregon to California and Arizona.

M. Torreyi Gray Proc. Am. Acad. ix, 213. Stems 1-12 inches high from an annual root, branching from the base: lower leaves oblong, rather short, pinnatifid with short and dentate lobes, teeth and lobes callous-mucronate: heads seldom less than half-inch high, broadish-campanulate, short peduncled on the leafy branches: bracts of the involucre lanceolate, acuminate: achenes linear-oblong, 5-angled by as many salient often almost wing-like ribs, a much less prominent pair in each interval: outer pappus of 2-3 stout persistent bristles, between the thickish bases of which are minute teeth. Southeastern Oregon to Nevada and Utah.

104 APARGIDIUM T. & G. Fl. ii, 474.

Low herbs with fusiform biennial roots, all radical leaves, and rather small heads of yellow flowers on slender scapes. Heads many-flowered, nodding in bud. Involucre narrow-campanulate; its bracts strongly 1-nerved, in 2-3 series. Receptacle naked. Achenes columnar, truncate, smooth. Pappus brownish, of copious rather rigid and fragile barbellate-denticulate capillary bristles, with some outer and smaller ones nearly smooth.

A. boreale T. & G. l. c. Scape solitary, slender, 6-12 inches high, bearing a single head: leaves linear-lanceolate, 3-6 inches long, attenuate at both ends, entire, or obscurely undulate: involucre 6-9 lines high; of 10-15 lanceolate acuminate principal bracts and about as many similar but smaller outer ones. Wet meadows in the high mountains, Alaska to California. *Uchinsk, V. I. (Cape Province)*

105 HIERACIUM Tourn. L. Gen. n. 913.

Perennial herbs with alternate or all radical leaves and small to large erect heads of yellow, rarely white or red flowers in panicles or corymbs, or solitary. Involucre several- to many-flowered of narrow equal bracts and some short calyculate ones, or sometimes imbricated, not thickened at base nor with thickened midrib. Achenes oblong or columnar, smooth and glabrous, mostly 10-ribbed or striate, either terete or 4 or 5-angled, slightly contracted at the very base, commonly of the same thickness to the truncate summit. Pappus of rather rigid scabrous fragile bristles, brown or brownish, rarely white and soft.

§ 1 ARCHIERACIUM Fries. Heads corymbosely paniculate. Involucre of the comparatively large heads irregularly more or less imbricated. Achenes columnar. Pappus of numerous unequal bristles.

H. Canadense Michx. Fl. ii, 86. Stems robust, 4-6 feet high: leaves from lanceolate to ovate-oblong, acute, sparsely and acutely dentate, or even lacinate, at least the upper partly clasping and broad or broadish at base: involucre usually pubescent when young, occasionally glandular, the narrow outermost bracts loose: pappus sordid. Dry open woods, Oregon and northward to Pennsylvania and Canada.

§ 2 STENOITHECA T. & G. Fl. ii, 476. Involucre a series of equal bracts and a few short calyculate ones, usually narrow

and few- to many-flowered, tapering to the bristles.

* Crinite-hairs, especially on the columnar and

H. longiber stems usually lanceolate, entire in an irregular lanceolate acuminate base, all densely clothed along the

H. Scouleri hairs, pale and leaves lanceolate, rather few, in a linear-lanceolate, successively short glandular: pappus

** Crinite hairs above, and flowers yellow

H. triste few-leaved, bearing radical leaves or sparse pale hairs, lanceolate, densely clothed with long hairs to northern

*** Dark and lower part

H. gracile stems tufted, subovate to oblong, entire or repand, lower linear-bracts all nearly and also tomentose, most white. In the Rocky Mountains

**** Not stem sparsely

+ Flowers white

H. albiflorum to numerous small cyme: leaves of upper sessile by involucre campanulate, imbricated or nearly so, not long. Common in Rocky Mountains

and few- to many-flowered. Achenes in a few species slender or tapering to the summit. Pappus of more or less scanty equal bristles.

* Crinite-hirsute with long and whitish or yellowish shaggy hairs, especially on both sides of the entire leaves: flowers yellow: achenes columnar and short, not at all narrowed upward.

H. longiberbe. Whole plant sparsely covered with long soft hairs: stems usually slender and ascending or suberect, 6-18 inches long: leaves lanceolate, entire or sparingly dentate, 3-6 inches long: heads rather few, in an irregular panicle: involucre campanulate, 6 lines high, of 10-20 lanceolate acuminate principal bracts with smaller calyculate ones at their base, all densely clothed with long spreading hairs, not glandular. On cliffs along the Columbia river near the Cascades.

H. Scouleri Hook. Fl. i, 198. Sparingly pubescent with long crisp hairs, pale and more or less glaucescent: stems 1-2 feet high, very leafy: leaves lanceolate, sessile or the lowest short-petioled, 2-6 inches long: heads rather few, in a loose irregular panicle: involucre 6 lines high; its bracts linear-lanceolate, often acuminate, imbricated in 2 or 3 series, the outer successively shorter, all beset with long bristly hairs, and more or less glandular: pappus whitish. Brit. Columbia to Oregon and Montana.

** Crinitely long-villous with soft-woolly and blackish smooth hairs above, wanting below: without stellate or glandular pubescence: flowers yellow: pappus fuscous.

H. triste Cham. in herb. Willd. Stems simple, 4-12 inches high, few-leaved, bearing solitary or 2-4 racemously disposed small heads: radical leaves obovate to spatulate, entire, green and glabrate, or with sparse pale hairs; cauline oblong, upper ones and stem more or less villous-lanate: heads half-inch high, livid: involucre and peduncle densely clothed with long dark-brown or partly grayish soft wool. Aleutian Islands to northern Washington.

*** Dark-hirsute and somewhat glandular on the involucre: leaves and lower part of stems glabrous, or at most pubescent: flowers yellow.

H. gracile Hook. Fl. i, 298. Pale green and more or less pubescent: stems tufted, slender, 2-18 inches high: leaves mostly in radical cluster, obovate to oblong-spatulate, 1-3 inches long, attenuate below to petioles, entire or repand-dentate: heads few to several, racemously disposed, the lower linear-bracteate: involucre about 4 lines high, its numerous linear bracts all nearly equal, beset with short black somewhat hispid hairs and also tomentose and glandular: achenes short-columnar: pappus almost white. In open places on the highest peaks; Alaska to California and the Rocky Mountains.

**** Not crinite but at least the radical leaves and base of the stem sparsely or even thickly setose-hirsute with spreading hairs.

+ Flowers white: stems leafy, and in large plants loosely branching

H. albiflorum Hook. l. c. Stems slender, 1-3 feet high, bearing few to numerous small heads in an open, simple or compound paniculate cyme: leaves oblong to broadly lanceolate, thin, 1-4 inches long; the upper sessile by a broad base, the lower tapering into slender petioles: involucre campanulate, 4-5 lines high, of several linear-lanceolate acute bracts, imbricated in 2 or 3 ranks, the outer successively shorter, glabrous or nearly so, not rarely with a few bristly hairs: achenes black, a line long. Common in dry wooded districts, Alaska to California and the Rocky Mountains.

* * Stems more or less leafy: involucre 15-30-flowered, oblong-campanulate, of rather numerous narrow and acute or acutish bracts: flowers yellow: achenes not narrowed upward: pappus from sordid to dull white.

H. cynoglossoides Arvet. Gray Proc. Am. Acad. xix, 68. More or less pubescent with somewhat hispid hairs, and the inflorescence glandular: stems 1-2 feet high, numerous from the crown of a perennial root. leafy: leaves lanceolate, mostly acute, 2-6 inches long; the upper sessile by a narrow base; the lower narrowed to a winged petiole: heads few to several in an open corymbose cyme: involucre 6-8 lines high: its linear acute bracts and short peduncles rather densely hirsute with short black hairs as well as glandular: achenes rather short. In open woods British Columbia to California and the Rocky Mountains.

H. amplum Greene Eryth. iii, 101. "Stoutish 2 or 3 feet high, amply leafy up to the rather broad corymbose panicle, but no radical tuft of foliage: leaves oblong-spatulate, acutish, entire, 4-6 inches long hirsute along the margins, and with scattered appressed hairs on both faces: upper cauline leaves and branches of the inflorescence pale and glaucescent, seemingly glabrous, but somewhat tomentose-puberulent under a lens: involucre about 5 lines high, loosely calyculate the subequal bracts dark with black setulose stout hairs otherwise glabrous: ligules yellow: achenes columnar or even slightly widening to the summit: pappus white. On hill-sides at 6000-7000 feet altitude Mount Adams, Washington, Suksdorf."

H. barbigerum Greene Pitt. iii, 228. Stems slender, tufted, from deep seated somewhat running rootstocks, 4-10 inches high, leafy only near the base: leaves somewhat crowded but not rosulate, lanceolate to spatulate, short petioles and leaf-margins hirsute with long spreading hairs which extend more sparsely to both sides of the leaves and stem, the lower faces of the leaves also tomentulose with branched hairs: heads 1-5, in a loose cyme: involucre campanulate, about 6 lines high its linear bracts hirsute and tomentulose like the leaves with also a few dark setulose hairs: pappus nearly white. On grassy slopes of Ashland Butte, Oregon, to Lassen county, California.

H. cinereum. Cinereous with a minute white scurfy tomentum: stems rather stout, 6-10 inches high, from stout creeping rootstocks forming large patches leafy only toward the base: leaves lanceolate or narrower, acute or acuminate, 3-4 inches long, sparsely denticulate narrowed below to broad winged petioles; sparsely hirsute with crisp hairs: heads several to numerous in a close corymbose paniculate-cyme: involucre 5-6 lines high, its linear principal bracts with broad scarious margins, the outer and shorter ones subulate all sparsely or not at all hirsute: pappus sordid. In open places near Table Rock, Clackamas county, Oregon.

* * * * Leaves all at the base of the loosely branching scape-like stem: flowers yellow only 5-15 in the narrow and diffusely paniculate heads: achenes slightly if at all tapering to the summit.

H. Bolanderi Gray Proc. Am. Acad. vii, 265. Stem slender, 6-18 inches high, commonly solitary, glabrous: leaves nearly all in a radical tuft, ovate to broadly lanceolate mostly obtuse, sparingly denticulate or entire 2-3 inches long, tapering below to a winged petiole, pale and glaucous below, green and beset with bristles above: heads few to several in a loose paniculate cyme: involucre narrow, 5-lines high, glabrous of 5-10 linear-lanceolate, very acute principal bracts and a few smaller ones at their base: achenes fully as long as the pappus.

H. Howellii Gray Bot. Gaz. xiii, 73. Stems 1-2 feet high, hoary with close stellular pubescence, hirsute below: leaves spatulate to oblanceolate entire or some of them sparingly dentate, 3-4 inches long, obtuse, tapering

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below to short petioles, or the cauline sessile, villous-crinite and tomentose-canescens both sides: heads rather numerous, in an open panicle few-flowered: involucre about 5 lines high cylindrical of 6-8 linear-lanceolate obtuse principal bracts and a few shorter ones at their base, all hoary with close stellular pubescence, without any setose bristles: pappus white when young. Open Rocky ridges, Mooney Mountain, Josephine county, Oregon.

106 CREPIS L. Gen. n. 9. 14.

Perennial or annual herbs with alternate or all radical mostly toothed or pinnatifid leaves and small or middle-sized heads of yellow flowers. Involucre few- to many-flowered, cylindric, campanulate, or swollen at base, its principal bracts in one series, equal, with a number of exterior smaller ones. Receptacle mostly flat, naked or short-fimbriate. Achenes from columnar to fusiform, 10-20-ribbed or nerved, not transversely rugose, narrowed at the base and apex. Pappus of copious white and usually soft capillary bristles.

* Bracts of the involucre thickening and becoming more or less rigid at base in age: achenes beakless or nearly so.

C. VIRENS L. Sp. ed. 2, 1134. Glabrous annual; stems leafy 1-2 feet high corymbosely branched above: radical leaves spatulate to lanceolate, from dentate to lacinate pinnatifid, 2-8 inches long, narrowed below to petioles: cauline smaller and narrower, clasping by a sagittate base the upper usually very small and entire: heads numerous, slender-peduncled: involucre 4-5 lines high, oblong, more or less pubescent or glandular, its principal bracts lanceolate, the outer mostly appressed achenes oblong, 10-striate, smooth slightly contracted at both ends. In fields and waste places, British Columbia to California. Naturalized from Europe.

** Perennials: achenes beakless or short-beaked.

C. nana Richards, App. Franklin Journ. ed. 2, 62. Glaucous and wholly glabrous: low and depressed, forming tufts and bearing numerous clustered and narrow short peduncled heads: leaves chiefly radical, obovate to spatulate, entire, repand-dentate or lyrate, commonly equalling the clustered scapes or stems: involucre cylindrical 8-14 flowered, of 8-10 smooth and narrowly linear obtuse bracts in a single series and 3 or 4 short calyculate ones at base: achenes linear, unequally costate, obscurely contracted under the moderately dilated pappiferous disk. Alaska to the Wallowa Mountains of Oregon and to California.

C. runcinata T. & G. Fl. ii, 438. Slightly if at all glaucous: stems scape-like, 1-3 feet high, paniculately branched above: radical leaves obovate-oblong to oblong-lanceolate, 2-6 inches long, from repand-dentate to runcinate-pinnatifid, with short lobes or teeth; cauline none or small and narrow at the forks: involucre half-inch high or less, pubescent, often hirsute, sometimes glandular-hispidulous: achenes narrowly oblong, moderately narrowed upward, somewhat evenly 10-costate. In moist soil, southeastern Oregon to Manitoba and Iowa.

Var. hispidulosa. whole plant hispidulous and glandular. Moist places, southeastern Oregon.

C. Andersoni Gray Proc. Am. Acad. vi, 436. "Not glaucous, a foot or more high: leaves laciniately pinnatifid or dentate, but not runcinate: involucre half to three-fourths inch high, cinereous-pubescent, of broader and firmer bracts, more imbricated, outermost oblong: to ovate-lanceolate: achenes fusiform, usually 8-10-costate, tapering into a short but manifest beak." Eastern Oregon to Nevada and eastern California.

C. platyphylla Greene Pltt. iii, 27. "Related to *C. runcinata*, similarly acaulescent, the corymbosely paniced stout scape 12 to 18 inches high, rather strongly hispid and somewhat glandular: leaves depressed or ascending, oval and oblong to spatulate-oblong, subsessile or short petioled, mostly 4 to 6 inches long, often 3 in breadth, obtuse, coarsely and remotely, often somewhat runcinately toothed, green and glabrous above: involucre 4 or 5 lines high, very hispid, slightly glandular: achenes dark brown, oblong-fusiform, slightly contracted toward the summit, sharply 10-ribbed. Moist mountain meadows of southern Idaho and northern Utah."

C. subcarnosa Greene l. c. 107. "Stout and low, more or less pubescent, slightly succulent, the scape about a foot high, bearing at summit few and long-peduncled heads: leaves of spatulate-oblancoolate outline, obtuse or acutish, saliently but not runcinately toothed: peduncles and involucre glandular-hispid: slender-fusiform achenes tapering: pappus fine fragile. Meadows along the Humboldt River at Deeth and elsewhere in eastern Nevada, thence northward to southern Idaho."

C. acuminata Nutt. Trans. Am. Phil. soc. vii, 437. Minutely cinereous-pubescent below, but green: stems slender, 1-3 feet high, 1-3-leaved, bearing a fastigate or corymbiform cyme of numerous small heads: leaves elongated, slender-petioled, oblong-lanceolate in outline, laciniate-pinnatifid, tapering to both ends, the apex usually into a lanceolate or linear prolongation: involucre narrow-cylindrical, 4-6 lines long, rarely more than 6-flowered, of 5-8 principal bracts, glabrous, or the few minute bractlets tomentulose: mature achenes fusiform, considerably longer than the pappus, lightly striate-costate moderately attenuate at summit. Dry ground, eastern Oregon to California, Utah and Montana.

C. intermedia Gray Syn. Fl. i pt 2, 432. Cinereous-puberulent: stems 1-2 feet high, 1-3-leaved, terminating in a rather few-flowered corymb or paniculate cyme: leaves elongated, slender-petioled, oblong-lanceolate in outline, laciniate-pinnatifid, tapering to both ends, involucre half-inch or more high, canescently puberulent; its bracts in age carinate by thickening of the midrib: achenes acutely 10-costate when mature, oblong-fusiform, slightly attenuate upward, longer than or equalling the pappus. Eastern Washington and Brit. Columbia to California and the Rocky Mountains.

C. occidentalis Nutt. Journ. Acad. Philad. vii, 29. Canescent with a close scurfy tomentum; stems usually 4-18 inches high, solitary or 2 or 3 from a single caudex, corymbosely branched above, rarely from near the base, often with glandular bristly hairs above: leaves from runcinately toothed to deeply pinnatifid, or somewhat bipinnatifid; the lower and radical 4-10 inches long, narrowed into petioles; the upper sessile and slightly clasping: heads few to several, corymbosely paniced: involucre 6-8 lines high, cylindraceous, its principal bracts linear and acute, with several small ovate to subulate calyculate ones at their base, all canescent with close minute tomentum, and often with a few short bristles: achenes fusiform, truncate at the apex, 10-18-costate. On dry plains and hillsides, Brit. Columbia to California and Colorado. East of the Cascade Mountains.

C. monticola Coville Cont. Nat. Herb. iii, 562. Crinitely pubescent with long brownish glanduliferous hairs: stems stout, usually solitary, freely branching, 6-12 inches high: leaves oblong to broadly lanceolate in outline, 2-4 inches long, acute, narrowed below to short petioles or narrow sessile base; sometimes with merely dentate margins, sometimes deeply pinnatifid with toothed or even pinnatifid lobes: involucre 8-10 lines high, narrow-campanulate; its principal bracts narrowly lanceolate, acuminate, nearly or quite equalling the ligules. Dry hillsides, southern Oregon to California.

C. scopulorum Coville l. c. 563. Scantily tomentose, usually glabrate

n age, and bearing rather slender, 1-3 leaved, bearing 1-5 pinnately or bipinnately, usually its bracts linear-achenes 4-6 lines high, sometimes obscure to Montana,

C. rostrata Greene l. c. 108. Stems slender, 1-3 feet high, bearing at summit few and long-peduncled heads: leaves of spatulate-oblancoolate outline, 4-6 inches long, toothed lobes: involucre long glandless with part contracted into eastern Oregon and

C. barbiger Greene l. c. 109. Minute somewhat from the crown bearing an ample lanceolate in outline into linear-lanceolate principal bracts, base, all canescent bristles. Dry ri

Leafy-stemmed pinnatifid leaves, of white yellow cylindrical, usually equal bracts a flat, naked. Sometimes striately copious rather

N. alatus H. or nearly so: hastate-deltoid, abruptly contracted petiole, or small loosely and somewhat long, of 8-10 of gins, imperfect flowered: corolla sometimes with

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in age, and bearing toward the base scattered eglandulose bristles: stems rather slender, 10-20 inches high, solitary or rarely 2 from the same caudex, bearing 1-5 heads: leaves broadly lanceolate in outline, 4-6 inches long, pinnately or bipinnately divided into linear-lanceolate lobes: peduncles slender, usually thickened just below the heads: involucre 6-8 lines high; bracts linear-lanceolate and barely acute, or the shorter ones acuminate: achenes 4-6 lines long, fusiform, truncate at the apex, not costate, but sometimes obscurely striate. Dry hillsides, eastern Oregon and Washington to Montana, Utah and Nevada.

C. rostrata Coville l. c. 564. Sparingly hirsute with glan-fless hairs, and more or less tomentose: stems 4-15 inches high, 1-3 from each caudex, striate-angled, bearing 1-3 heads: leaves oblong to broadly lanceolate in outline, 4-6 inches long, pinnately parted into linear-lanceolate entire or toothed lobes: involucre 6-8 lines high, more or less densely clothed with long glandless white hairs: achenes 4-5 lines long, not costate the upper part contracted into a distinct beak 1-2 lines long. Rocky hillsides, eastern Oregon and Washington to Brit. Columbia.

C. barbiger Leiberg, Coville l. c. 565. Slightly tomentose with a minute somewhat flocculent tomentum, not at all hirsute: stems several from the crown of a thick perennial root, 1-2 feet high, sparingly leafy and bearing an ample corymbose cyme of rather small heads: leaves broadly lanceolate in outline, 4-10 inches long, runcinately toothed or deeply cut into linear-lanceolate lobes: involucre 5-7 lines high, of linear, mostly obtuse principal bracts and a few very small ovate or lanceolate acute ones at base, all canescent-tomentose and more or less bristly with setaceous white bristles. Dry ridges and rocky banks, eastern Oregon and Washington.

107 NABAI JS Cass. Dict. Nat. xxxiv, 94.

Leafy-stemmed perennial herbs with alternate dentate or pinnatifid leaves, and usually numerous small mostly nodding heads of white yellowish or purplish flowers. Involucre 5-30-flowered. cylindric, usually narrow, unchanged in age, of 1 or 2 series of equal bracts and a few calyculate ones at their base. Receptacle flat, naked. Achenes terete or 4-5-angled, usually striate, sometimes striately pluricostate, truncate at summit. Pappus of copious rather rigid capillary bristles.

N. alatus Hook. Fl. i, 294, t. 102. *Prenanthes alata* Gray. Glabrous or nearly so: stems 1-2 feet high, the larger plants branching: leaves hastate-deltoid, acute or acuminate, sharply and irregularly dentate, abruptly contracted or some of the upper cuneately decurrent into a winged petiole, or small uppermost narrow and sessile by a tapering base: heads loosely and somewhat corymbosely paniced: involucre campanulate-oblong, of 8-10 often livid bracts, nearly or quite destitute of scarious margins, imperfectly calyculate by 2 or 3 loose linear accessory ones, 5-15-flowered: corollas purplish: achenes slender, 3-4 lines long, at least sometimes with tapering summit. On moist cliffs, Alaska to Oregon.

108 LYCODESMIA Don Edinb. Phil. Journ. vi, 305.

Smooth herbs with usually rush-like rigid or tough stems, linear or scale-like leaves and terminal or scattered erect heads of pink or rose-colored flowers. Heads 3-12-flowered. Involucre cylindric, its principal bracts 5-8, linear, scarious-margined, equal, slightly united at the base, with several very short outer ones. Receptacle flat, naked. Achenes terete, obscurely striate



or angled, usually linear or slender-fusiform. Pappus of copious and usually unequal soft or somewhat rigid bristles, from white to brownish.

L. juncea Don l. c. Perennial by a thick woody root: stems stiff, much branched, 8-18 inches high, striate-angled, not spinescent: lower leaves lanceolate, rigid, entire, acute or acuminate, $\frac{1}{2}$ -2 inches long; the upper similar but smaller, or reduced to subulate scales: heads mostly 5-flowered, solitary at the ends of the branches: involucre about half-inch high, its bracts usually gland-tipped: achenes narrowly columnar or shortly tapering to the summit: pappus light brown. Dry plains, eastern Idaho to Nevada and Minnesota.

L. spinosa Nutt. Trans. Am. Phil. Soc. vii, 444. Stems slender and rigid, low, much branched from an indurated and matted-woolly perennial base, otherwise glabrous: branchlets divergent, spinescent, bearing minute scales in place of leaves, and lateral very short-peduncled heads: lower cauline leaves linear, entire, thickish, above soon reduced to scales: involucre 3-5-flowered; its principal bracts not more numerous, rather loose, lanceolate; the unequal and more imbricated calyculate ones comparatively broad and large: achenes much shorter than the pappus, not at all narrowed upward, 4-5-costate: pappus white, of unequal bristles. Gravelly hills and plains, eastern Oregon to California, Nevada and Idaho.

109 AGOSERIS Raf. Fl. Loudv. 68.

Troximon Nuttall, not of Gærtner.

Acaulescent perennial or annual herbs with clustered radical leaves and mostly large heads of yellow flowers on simple scapes. Involucre campanulate or cylindraceous, the bracts mostly lanceolate, imbricated in few series, the outer loose and often somewhat foliaceous. Receptacle flat, naked. Achenes oblong or linear, terete, 10-ribbed, the apex contracted into a neck or prolonged into a beak, the broad base or basal callus to a narrow base more or less hollowed at the insertion. Pappus of copious white or whitish merely scabrous capillary bristles, which are either persistent on or separately deciduous from the dilated terminal areola.

§ 1 Achenes more or less linear, beakless, or tapering gradually into a beak on which the nerves or ribs of the body are produced to the apex: acaulescent perennials.

* No beak to the achene, its moderately short continued summit of the same texture as the body and equally 10-costate: involucral bracts somewhat equal, all tapering to a slender acumination: the outer from an oblong or ovate-lanceolate base, glabrous: pappus rigidulous.

A. alpestris Greene Pitt. ii, 177. *Troximon alpestre* Gray. Glabrous: rootstock or caudex elongated; leaves narrowly spatulate or lanceolate, pinately lobed or incised, or parted into narrow linear divisions; scapes 2-3 inches high, weak: involucre campanulate, 7-8 lines high, the bracts in about 2 series: achenes 2-3 lines long, equalled by the slender pappus-bristles. In the Cascade Mountains of Oregon and Washington.

* * Achenes with apex tapering gradually into a rather stout and nerved beak which is shorter than the body.

A. barbellulata Greene l. c. *Troximon barbellulatum* Greene. Not

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A. parviflora
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Glaucous: scapes slender, 1-3 inches high: linear-lanceolate, laciniate-pinnatifid into a few short and narrow lobes, or some entire: involucre narrow, over half-inch high, rather few-flowered; its 10 or 12 bracts nearly equal, lanceolately acuminate, glabrous: flowers yellow: achenes 3 lines long, about the length of the soft distinctly barbellulate pappus. Grassy slopes, high mountains of southern Oregon and northern California.

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A. tomentosa. More or less tomentose up to the involucre: scapes rather stout, 4-10 inches high: leaves lanceolate to linear in outline, irregularly and often retrorsely lobed or toothed, or some of the inner ones entire, acute, or acuminate, attenuate below to a short winged petiole, nearly as long as the scapes: involucre campanulate, 8-9 lines high, of rather numerous imbricated, lanceolate acuminate scarious-margined mostly glabrous bracts: achenes fusiform, short-beaked, much shorter than the brownish pappus. On grassy slopes, Stein Mountain southeastern Oregon.

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A. parviflora Greene l. c. *Troximon parviflorum* Nutt. Glabrous throughout: scapes slender, much longer than the leaves 5-15 inches high: leaves narrowly linear, acuminate, entire, 3-8 inches long: 1-3 lines wide: heads an inch broad or less: involucre oblong-ovoid, becoming nearly hemispheric in fruit, 6-8 lines high; its bracts lanceolate and acuminate: achenes conspicuously beaked, about 4 lines long: pappus of numerous unequal very slender bristles. Plains, Idaho to Manitoba, Nebraska and New Mexico.

♂ 2 Achenes with a slender and mostly filiform nerveless beak and soft pappus: acaulescent perennials.

* Achenes acute or tapering at summit into a beak but little if at all longer than the cylindraceous or narrowly fusiform body.

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A. aurantiaca Greene l. c. *Troximon aurantiacum* Hook. Nearly glabrous, deep green and not at all glaucous: leaves oblanceolate, obtuse, entire, narrowed to a slender petiole: involucre 7-9 lines high: its bracts from broadly to narrowly lanceolate, acute, or the outer and looser ones oblong and obtuse: flowers orange, drying brownish or purple achenes thickish, tapering gradually to a short stout beak. High mountain prairies, Oregon to Alaska and the Rocky Mountains.

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the apex:

A. purpurea Greene l. c. Sparsely lanate when young, in age glabrate, more or less glaucous: scapes 6-20 inches high, enlarged and tomentose at the summit: leaves from linear to lanceolate saliently or often runcinately toothed or lobed: bracts of the involucre moderately well imbricated, 4-12 lines long, lanceolate and long-acuminate, or the outer ones oblong and obtuse: corollas deep saffron-color, drying purple: achenes black, fusiform, with a slender beak about as long as the body: pappus white. Mountain meadows, Oregon and Washington to the Rocky Mountains.

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A. gracilentia Greene l. c. *Troximon gracilens* Gray Scapes slender, 10-18 inches high: leaves mostly entire, from lanceolate to nearly linear, or some narrowly spatulate: involucre bracts narrow: corollas deep orange: achenes fusiform-linear, 3-4 lines long; the very slender beak as long or longer: pappus soft but not flaccid. In the Cascade Mountains of Oregon and Washington to Wyoming.

Glabrous:
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A. elata Greene l. c. *Troximon Nuttallii* Gray. Robust; scapes 6-20 inches high: leaves thickish, from lanceolate to spatulate, and from sparingly dentate to pinnatifid, 6-12 inches long, glaucous: heads an inch or more high and broad: involucre bracts lanceolate, acute, more or less pubescent: corollas yellow: achene thickish, 8 lines long, with a beak as long or longer. Moist ground, eastern Oregon to California and Utah.

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eene. Not

A. apargioides Greene l. c. *Troximon apargioides* Less. Low and tufted from a multicapital caudex, glabrate: leaves spatulate, obtuse, 2-4 inches long, narrowed below to a slender petiole, entire or with a few salient teeth or lobes, or pinnatifid with sparse linear divisions: scapes 6-12 inches high: heads half-inch high: involucre campanulate; the inner bracts linear-lanceolate, the outer oblong, acute, more or less tomentose: achenes and beak each about 2 lines long: pappus soft, dull-white. Sandy soil along the coast of Oregon and California.

* * Achenes oblong or short-fusiform, with a filiform or almost capillary beak 2-4 times as long: pappus soft and fine: flowers all yellow.

+ Pappus about as long as the beak.

A. hirsuta Greene l. c. *Troximon humile* Gray. Scapes 8-20 inches high, slender: leaves hirsutely pubescent, from lanceolate to spatulate in outline, and from repand-dentate or lyrate-pinnatifid to pinnately parted into linear lobes: involucre permanently villous: flowers exserted: filiform beak only about twice as long as the whitish achene. Near the coast. Washington to California.

+ + Pappus white, much shorter than the almost filiform beak.

A. laciniata Greene l. c. *Troximon laciniatum* Gray. Smooth and glabrous or with sparse soft pubescence: scapes 1-2 feet high: leaves elongated-lanceolate, lacinate-dentate or commonly deeply pinnatifid with linear lobes: involucre glabrous or glabrate, or the base of the outer of the lanceolate bracts tomentose: achenes 2, and beak 5-7 lines long. In low ground, Vancouver Island to California.

A. grandiflora Greene l. c. 178. *Troximon grandiflorum* Gray. Scapes stout, 1-2 feet high: leaves hirsutely or cinereous-pubescent, or glabrate: spatulate to lanceolate, sinuate-dentate to lacinate-pinnatifid or even pinnately parted: involucre broad, usually well imbricated: its bracts lanate or tomentose when young, often glabrate in age: heads in fruit 1-1½ inch high: achenes 2, and capillary beak 6-8 lines long. Plains and moist hillsides, Washington to California.

A. retrorsa Greene l. c. *Troximon retrorsum* Gray. Villous-tomentose when young: scapes stout, 12-18 inches high: leaves pinnately parted into linear-lanceolate usually retrorse lobes, the terminal lobe long and narrow; all callous-tipped: involucre narrowly oblong, 1½-2 inches high when mature: its linear-lanceolate bracts hardly surpassed by the soft white pappus: ligules short: achenes 3 lines long: abruptly contracted at summit; their filiform beaks 10-12 lines long. Open pine woods, southern Oregon to California and southern Idaho.

§ 3 Achenes fusiform, with filiform nerveless beak and soft pappus: subcaulescent annuals with yellow flowers.

A. heterophylla Greene l. c. *Troximon heterophyllum* Greene. Somewhat villous, or hirsutely pubescent or glabrate: scape-like peduncle 3-12 inches high: leaves from spatulate to linear-lanceolate, denticulate to pinnatifid: involucre oblong-campanulate, 6-9 lines high: its bracts erect, lanceolate or narrower; the outer decidedly shorter than the glabrous inner ones, more or less pubescent but not villous: achenes various, but at most only 2 lines long, usually fusiform; beak 3-4 lines long, mostly longer than the white or whitish pappus. Open places, Brit. Columbia to California.

Var. glabra. Glabrous throughout and more or less glaucous: small, 2-4 inches high. Hillsides near the Columbia river, eastern Oregon and Washington.

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110 TARAXACUM Haller Stirp. Helv. i, 23.

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Acaulescent perennial herbs with rosulate leaves, naked scapes that elongate in fruit, and mostly large heads of yellow flowers. Heads many-flowered, usually solitary at the summit of the simple hollow scapes. Involucre a single series of nearly equal narrow bracts that are slightly united at base, and several or numerous calyculate ones. Receptacle flat, naked. Achenes oblong-ovate or fusiform, 4-5-costate or angled, and usually with some intervening nerves, muricate or spinulose, at least near the summit which is abruptly contracted into a filiform beak. Pappus soft and capillary, dull white.

T. officinale Webber Prim. Pl. Holst. 56. Scapes and leaves from the crown of a thick vertical root: leaves from spatulate-oblong to lanceolate in outline, and from irregularly dentate to runcinate pinnatifid, 3-10 inches long: bracts of the involucre linear-lanceolate, not glaucous, the outer reflexed, all acute: achenes greenish-brown, fusiform, squamulose toward the summit, abruptly contracted into a conical apex which is prolonged into a filiform beak 2 or 3 times as long as the achene. Common in fields and waste places. Naturalized from Europe.

111 RAFINESQUIA Nutt. Trans. Am. Phil. Soc. vii, 429.

Leafy-stemmed annuals with pinnatifid leaves and rather large heads of white or flesh-colored flowers terminating the paniculate branches. Heads 15-30 flowered. Involucre conical or cylindraceous, of 7-15 equal linear attenuate principal bracts and some loose calyculate ones. Receptacle flat and naked. Achenes terete, somewhat fusiform, obscurely few-ribbed, attenuate into a slender beak, the broad base hollowed but not callous-thickened at the insertion. Pappus of 10-15 capillary bristles, softly long-plumose from the base to near the tip.

R. Californica Nutt. l. c. Glabrous throughout: stem stout, much branched, 2-3 feet high: leaves oblong; the lower 4-6 inches long; the upper gradually reduced to small bracts: involucre becoming thick at base and more or less conical; its rather numerous calyculate bracts subulate and spreading: ligules short, white: achenes tapering into a very slender beak as long as the body: pappus dull white, the bristles fine and soft. Shady ground, eastern Oregon to California.

112 LACTUCA Tourn. Inst. t. 267. L. Gen. n. 909.

Tall herbs with alternate leaves and small paniced heads of yellow white or blue flowers. Involucre cylindric, several to many-flowered, either calyculate or more regularly imbricated. Receptacle flat, naked. Achenes flat, 3-5-ribbed on each face, narrowed above, or contracted into a narrow beak, which is more or less expanded at the summit into a small disk that bears the copious white or brownish pappus bristles which fall separately.

§ 1 SCARIOLO DC. Prodr. vii, 133. Achenes very flat, orbicular to oblong, abruptly produced into a filiform beak which bears the soft white pappus on its dilated apex.

L. SCARIOLA L. Sp. ed. 2 1119. Biennial: glabrous throughout or hirsute at the base; green and glaucous: stem stout, 2-7 feet high, leafy, usually paniculately branched: leaves lanceolate to oblong, with spinulose-denticulate margins, sometimes sinuate-toothed or pinnatifid, sessile or auriculate-clasping, midrib below beset with weak prickles: heads small, 6-12-flowered, very numerous, in an open panicle: corollas pale yellow: achenes obovate-oblong, several-nerved, margined, about as long as the filiform beak. Becoming common in fields and waste places. Introduced from Europe.

L. SATIVA The common LETTUCE is common along the Rail Road in the southern part of Oregon but is hardly naturalized.

L. Canadensis L. Sp. ii, 796. Biennial or annual: glabrous and glaucous: stem strict, 4-12 feet high, very leafy up to the elongated narrow panicle: leaves mostly sinuate-pinnatifid, 6-12 inches long, with margins entire or sparingly dentate, and midrib naked or rarely some sparse bristles, most of the cauline partly clasping by a sagittate or auriculate base: involucre half-inch or less high, 12-20-flowered: flowers yellow: achenes blackish, obscurely scabrous-rugulose, lightly 1-nerved on the middle of each face, broadly oval, with distinct thin margins, rather longer than the beak: pappus white. Moist woods, Oregon and Washington to the Eastern States.

L. sagittifolia Ell. Bot S. C. & Ga ii, 253. Glabrous; 3-6 feet high: leafy nearly to the usually loosely paniculate inflorescence: leaves oblong to lanceolate, 3-10 inches long, acute or acuminate, entire or denticulate, the lower sometimes pinnatifid, whitish beneath, midrib naked: involucre 5-7 lines high: flowers pale yellow or purplish: achenes oval, thin-margined longer than the beak. Open ground, Idaho to the Eastern States.

§ 2 **LACTUCASTRUM** Gray Syn. Fl. i, pt, 2, 443. Root perennial. Involucre well imbricated. Achenes lanceolate-oblong, flat, not margined, tapering into a beak not longer than the breadth of the body.

L. pulchella DC. Prodr. vii, 134. Very glabrous: stems 1-5 feet high, leafy up to the open corymbiform panicle: leaves from linear-lanceolate to narrowly oblong, entire or runcinate-dentate, or some lower ones pinnatifid; cauline sessile but not auriculate at base: branches of the loose panicle scaly: involucre 8 lines high, 12-15-flowered, its outer bracts ovate-lanceolate: flowers bright blue or violet-purple: achenes barely 2 lines long, striate-nerved, the tip of the short beak soft and usually whitish. Alluvial ground, Oregon to Brit. Columbia, Hudson Bay and Michigan.

§ 3 **MULGEDIUM** Gray l. c. Biennial or perennial herbs with usually bluish flowers, Achenes thickish, oblong, with some strong ribs and nerves: contracted at summit into a short stout beak, or into a mere neck under the dilated apex.

L. spicata Hitchc. *L. leucophæa* Gray. Stem usually stout, 3-12 feet high, leafy up to the panicle: leaves 3-12 inches long by 2-6 broad, sinuately or runcinately pinnatifid, coarsely and irregularly or doubly dentate; upper cauline sessile by a mostly narrow but auriculate or partly clasping base: heads in a pyramidal crowded panicle: involucre oblong, 8 lines high: flowers bluish: achenes narrowed at summit to a short but manifest neck. Moist ground, Oregon to Brit. Columbia and the E. States.

113 **SONCHUS** Tourn. L. Gen. n. 908.

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S. OLERACEUS L. Sp. 794. Fibrous-rooted annual: stem nearly simple, 4-10 feet high: lower leaves petioled, lyrate-pinnatifid, 5-10 inches long, the terminal segment commonly large and triangular, the margins denticulate with mucronate or scarcely spiny teeth; upper pinnatifid, clasping by an auriculate or sagittate base, the auricles acute: involucre 6-8 lines high: achenes flat, longitudinally ribbed and transversely rugose. Common in fields and waste places. Naturalized from Europe.

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S. ASPER All. Fl. Ped. i, 222. Stem often stout. 1-6 feet high, from an annual root: leaves undivided, lobed or pinnatifid, spinulose-dentate; the lower spatulate to lanceolate, more or less distinctly petioled; the upper clasping by an auriculate base, the auricles rounded: involucre glabrous, about 6 lines high: achenes smooth, 3-nerved on each side. Common in fields and waste places. Naturalized from Europe.

ORDER LII, LOBELIACEÆ Juss.

Herbs, or rarely shrubs, with usually milky acrid juice, alternate leaves without stipules, racemose inflorescence and perfect 5-merous flowers. Calyx adnate to the whole or the lower half of the ovary, the limb cleft to the ovary into 5 lobes. Corolla inserted just where the calyx becomes free from the ovary, its lobes valvate or induplicate in the bud, commonly deeper cleft or completely split down between two of the lobes, the cleft mostly on the upper side in the open flower but becoming so by a twist; in the early bud the split looks toward the bract; the lobes sometimes disposed to separate from below upward and the limb to be bilabately irregular. Stamens inserted with the corolla and mostly free; anthers 2-celled, introrsely dehiscent, firmly united around the top of the style into a ring or short tube. Ovary 2-celled, with placenta projecting from the axis, sometimes 1-celled with two parietal placentae. Style entire: stigma usually 2-lobed, girt with a rim of hairs. Ovules and seeds mostly indefinitely numerous, small, anatropous. Embryo straight, in the axis of fleshy albumen.

* Corolla cleft to the base on one side: capsule free at the apex.

1 **Lobelia** Calyx-tube short: capsule many-seeded, 2-valved at the top.

** Corolla with a closed tube: capsule wholly inferior.

2 **Howellia** Calyx-tube linear-clavate: capsule 1-celled, few-seeded.

3 **Laurentia** Calyx-tube turbinate or oblong, corolla with tube as long as the limb: capsule short, 2-valved at summit.

4 **Bolella** Calyx-tube very long: corolla tube very short: capsule very long, opening by 1-3 long fissures.

LOBELIA L. Gen. n. 1099.

Herbs, or rarely shrubs with alternate leaves, and red, yellow, blue or white flowers. Calyx-tube turbinate, hemispheric or ovoid, adnate to the ovary. Corolla-tube divided to the base on one side; the limb bilabiate, the lobe on each side of the cleft turning away from the other three, which are somewhat united. Stamens free from the corolla-tube, monadelphous, at least above, 2 or all of the 5 anthers with a tuft of hairs at their tips, 3 of them usually larger than the other 2. Ovary 2-celled, the 2 placentae many-ovuled. Stigma 2-lobed. Capsule loculicidally 2-valved.

L. Dortmanna L. Sp. 929. Aquatic perennial: glabrous throughout; stem slender, simple, erect, hollow, naked except a few fleshy bracts, 6-18 inches high; leaves all submersed and tufted at the base of the stem, terete, obtuse, 1-2 inches long, hollow and longitudinally divided by a partition; flowers blue, in a loose terminal raceme, 6-8 lines long, on filiform pedicels: calyx-lobes subulate: larger lip of the corolla glabrous or nearly so. Borders of ponds, northwestern Washington to subarctic America and the Northeastern States.

2 HOWELLIA Gray Proc. Am. Acad. xv, 43.

Aquatic or semiaquatic herbs with alternate leaves, at least below, and small white flowers. Flowers of 2 forms; the emersed with conspicuous corolla, the submersed with corolla undeveloped. Calyx with slender tube, adnate for its whole length to the ovary, and a limb of 5 nearly equal narrow lobes. Corolla not surpassing the calyx, its very short tube split nearly to the base on one side; its 5 lobes almost equal. Stamen-tube nearly free, and with the included style slightly incurved. Anthers oval, the two smaller trisetulose; the three larger naked. Ovary strictly 1-celled, with two filiform parietal placentae, each 3-5-ovulate, upper ovules ascending, the lower pendulous. Capsule membranaceous, at maturity bursting irregularly on one side. seeds few, large, smooth, callous-apiculate at the chalaza.

H. aquatilis Gray l. c. Aquatic annual: stem weak, 6-18 inches high, branching: submersed leaves linear-setaceous, 2-6 inches long, entire; emersed leaves linear to oblong, sometimes sparingly toothed: flowers axillary, short-peduncled; calyx-lobes subulate or filiform, 2-4 lines long; corolla white, its lobes oblong: capsule half-inch long, linear-clavate, bearing a few soft white seeds. In ponds, in the vicinity of Portland, Oregon.

3 LAURENTIA Neck. Elem. i, 131.

Small and diffuse or creeping herbs with alternate leaves and axillary blue flowers. Calyx-tube and adnate ovary turbinate or oblong, the 5 lobes narrow. Corolla with tube as long as the limb, and not split; its larger lip 3-cleft and widely spreading; the smaller of two more erect or diverging divisions. Filaments and anthers completely united; two of the latter minutely bristle-tufted at the apex, nearly included. Capsule 2-valved across the projecting free apex, 2-celled. Seeds oblong or almost fusiform.

L. carnosula Benth. Glabrous somewhat succulent annual: stems 1-5

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inches long, rooting at the nodes: leaves oblong-linear or lanceolate, entire, sessile, 3-6 lines long: flowers axillary and above corymbose or racemose, long-pedicelled: calyx-lobes somewhat foliaceous, linear, obtuse, equalling the oblong-obconical or clavate tube: larger lip of the corolla 3-cleft into roundish-obovate lobes, blue with the 2-ridged palate yellow or whitish; the smaller lip of 2 lanceolate lobes: seeds smooth. Low and muddy places, southeastern Oregon to Wyoming and California.

4 BOLELIA Raf. Atl. Journ 120, 1832.

DOWNINGIA Torrey.

Glabrous annual herbs with sessile narrow leaves, the upper ones reduced to bracts, and axillary sessile flowers. Calyx-tube and adnate ovary very long and slender, 3-sided, usually twisted, its limb divided down to the ovary into five foliaceous lobes. Corolla with very short but entire tube and bilabiate limb; the smaller lip of two narrow recurved or spreading divisions, the other very broad and 3-lobed. Filaments and anthers both united into a somewhat curved tube; two of the latter bristle-tipped. Capsule very long and slender, early becoming 1-celled, with two filiform parietal placentae, remaining closed at the tip but the sides dehiscing by 1-3 long fissures.

B. elegans Greene Pitt. ii, 126. *Downingia elegans* Torrey. Stem simple or diffusely branched, 4-12 inches high: leaves ovate to lanceolate, acute, 3-15 lines long: calyx-lobes linear-lanceolate, 6-9 lines long: larger lip of the corolla 3-lobed, the lobes acute or acutish the other lobes lanceolate: capsule often two inches or more long: seeds short-oblong. In wet ground, Brit. Columbia to southern Oregon and Idaho.

B. pulchella Greene l c. *Downingia pulchella* Torrey, "Mostly lower or weaker-stemmed: leaves more linear and obtuse: large lip of the corolla deeply 3-lobed; the other two lobes oblong-ovate: seeds elongated-oblong. Wet banks, Oregon to California and Nevada "

ORDER LIII, CAMPANULACEÆ Juss. Gen. 163.

Herbs, rarely shrubs or trees, with bland milky juice, alternate simple leaves without stipules, regular 5-merous flowers, and 2-5-celled many-seeded capsules or berries. Calyx-tube adnate to the ovary; its 5-lobed persistent limb usually divided down to the ovary. Corolla valvate, induplicate or rarely imbricate in the bud, inserted on the calyx just where it becomes free from the ovary. Stamens inserted with the corolla and free or adnate at base: anthers with two parallel cells. Style one, almost always pubescent or puberulent for some distance below the 2-5 introrse stigmas. Ovules anatropous, on placentae projecting from the axis. Seeds small, usually smooth. Embryo straight, in the axis of fleshy albumen.

* Ovary and capsule long and narrow, or at least oblong

1 **Githopsis** Capsule opening at the top by a hole left by the falling away of the base of the style between the long calyx-lobes.

2 **Legousia** Capsule opening on the sides by 2 or 3 little valves which leave small round perforations.

* Ovary and capsule short and broad.

- 3 **Heterocodon** Calyx-lobes very broad: capsule thin-walled, not dehiscent but bursting indefinitely between the ribs.
- 4 **Campanula** Calyx-lobes narrow: capsule opening on the side by 3-5 small valves leaving definite round perforations.

1 GITHOPSIS Nutt. Trans. Am. Phil. Soc. viii. 258.

Annual herbs with alternate leaves and blue flowers. Flowers all alike and corolliferous. Tube of the calyx club-shaped, strongly 10-ribbed, adnate up to the summit of the ovary: the limb of five long and narrow foliaceous lobes. Corolla tubular-campanulate. 5-lobed. Filaments short, dilated at the base: anthers linear. Ovary 3-celled. Stigma 3-lobed. Capsule clavate, coriaceous, crowned with the rigid calyx-lobes, strongly striate-ribbed, many seeded, opening where the base of the style falls away by a narrow hole. Seeds very numerous, smooth.

H. specularioides Nutt. l. c. Stem rigid, 2-10 inches high: leaves small, linear-oblong, coarsely toothed, sessile: flowers solitary terminating the stem or branches, or becoming lateral, strictly erect: corolla blue: capsule tapering into a very short and stout peduncle. Open places, western Washington to California.

2 LEGOUZIA Durand Fl. Bourg, ii. 26. (1782.)

SPECULARIA Hiester.

Annual herbs with alternate leaves and axillary blue flowers. Flowers often dimorphous, the earlier ones smaller and with undeveloped corolla, and cross-fertilized in bud. Calyx-lobes in the early flowers 3 or 4, in the later ones 5, narrow. Calyx-tube narrow, more or less elongated. Corolla short and broad, rotate or nearly so when expanded, 5-lobed or 5-parted. Anthers linear. Stigmas and cells of the ovary 3-4. Capsule obconical or cylindrical, opening by one or more small valvular openings on the side, either near the summit or near the middle.

L. perfoliata Britton Mem. Torr. Club, v. 309. *Specularia perfoliata* A. DC. Stem 6-20 inches high, very leafy throughout, simple or branched from the base, hirsute or hispid on the angles: leaves round cordate and clasping, mostly crenate, veiny, 6-12 lines broad: flowers sessile, single or clustered in the axils: calyx-lobes of the early flowers 3-4 and short, of the corolliferous ones as long as the ovary: capsule oblong or somewhat conical, the 2 or 3 valvular openings at or below the middle: seeds lenticular. Open grounds and fields, Brit. Columbia to California and the Eastern States.

3 HETEROCODON Nutt. Trans. Am. Phil. Soc. viii. 255.

Slender annual herbs with alternate sessile leaves and blue flowers of two forms. The lower and earlier flowers with merely rudimentary corolla. Calyx with short tube and large foliaceous lobes. Corolla 5-lobed. Capsule obovoid, 3-angled, 3-celled, many-seeded, very thin and membranaceous, the delicate walls bursting indefinitely on the sides.

H. rariflorum diffusely spread clasping base of ovary and terminal foliaceous broad with developed seeds oblong, from Asia to California

Perennial with showy blue or Calyx with small campanulate corolla dilated at base of the ovary 3-5 near the base

* Root per

C. Piperi. 4 inches high, flowers: leaves coarsely and shape of the shoots with obconic, the subling the opening strongly recurved Olympic Mountains

C. scabrella minutely scabrous stipital caudex spatulate; upper long as its capsule summit. Grassy plains of California

C. rotundifolia 1 1/2 inches long, ovate cordate, slender erect on the stem subulate, spread campanulate, 7-8 by short clefts in Alaska to California species, perhaps

* * Root persistence centrifugal, the narrow turbinate, the

C. Scouleri slender, 6-13 inches long 1-3 inches long margined petiole pedicels, pale bl

H. rariflorum Nutt. l. c. Sparingly hirsute: stems filiform, leafy, diffusely spreading, 4-12 inches long: leaves orbicular, with cordate partly clasping base coarsely many-toothed, 4-8 lines long: flowers solitary, axillary and terminal: calyx with short ovoid or inversely pyramidal tube and foliaceous broadly ovate sparingly toothed veiny lobes: only the later flowers with developed pale blue corolla which barely equals the lobes of the calyx: seeds oblong, obscurely triangular. In wet places and fields, Brit. Columbia to California, and Idaho.

4 CAMPANULA L. Gen. n. 218.

Perennial or annual herbs with alternate leaves and usually showy blue or white flowers. Flowers all alike and corolliferous. Calyx with short and broad tube and 5-lobed limb. Corolla campanulate or nearly rotate, 5-lobed or 5-parted. Filaments dilated at base: anthers oblong or linear. Stigmas and cells of the ovary 3-5. Capsule mostly short, opening on the sides or near the base by 3-5 small uplifted valves or perforations.

* Root perennial: style not longer than the corolla, straight.

+ Openings of the capsule toward its summit.

C. Piperi. Glabrous: stems numerous from a multicapital caudex, 1-4 inches high, very leafy to the top, bearing one to several bright blue flowers: leaves cuneate to spatulate, narrowed below to broad petioles, coarsely and sharply serrate, or irregularly dentate, 4-18 lines long, those of the shoots withering and persistent for several years: calyx-tube short, obconic, the subulate or linear-lanceolate lobes 6-8 lines long, about equaling the open-campanulate corolla anthers linear: stigmas usually 3, strongly recurved: capsule almost globular. On cliffs, Mount Steele, Olympic Mountains, Washington. Distributed by Mr. Piper as *C. aurita*.

C. scabrella Engelm. Bot. Gaz. vi, 237. Cinereous-puberulent or minutely scabrous to nearly glabrous: numerous stems from a multicapital caudex, 2-5 inches high, 1-4-flowered: leaves thickish; radical spatulate; upper cauline linear: lobes of the corolla ovate-lanceolate as long as its campanulate tube capsules oblong-turbinate, not narrowed at summit. Grassy slopes, Mount Adams Washington to the highest mountains of California.

+ + Openings of the capsule near the base.

C. rotundifolia L. Sp. 163. Stems slender, erect or diffuse, 6-30 inches long, one to several-flowered: lowest leaves orbicular or ovate to cordate, slender-petioled; cauline leaves all linear and sessile: flower-buds erect on the slender pedicels; flowers drooping or spreading; calyx-lobes subulate, spreading, longer than the short turbinate tube; corolla blue, campanulate, 7-12 lines long: capsule obconic or ovoid nodding, opening by short clefts near the base. Common on rocky banks and creek-bottoms, Alaska to California and across the Continent Europe and Asia. A variable species, perhaps as here defined includes more than one species.

* * Root perennial: leaves sharply or laciniately serrate: inflorescence centrifugal and racemiform: style filiform and straight, exceeding the narrow-campanulate corolla: capsule hemispherical or short-turbinate, the openings near the middle or near the base.

C. Scouleri Hook. Fl. ii, t. 125. Glabrous or a little pubescent: stems slender, 6-13 inches long, often branched: leaves from ovate to lanceolate, 1-3 inches long, acute and acutely serrate, mostly tapering at base to a margined petiole: flowers more or less panicled, drooping, on long filiform pedicels, pale blue, the terminal one opening first: calyx with oblong tube

and setaceous-subulate lobes: corolla 6-8 lines long, its lanceolate acute lobes longer than the tube: capsule 3-4 lines long, strongly angled. Common in coniferous woods, Vancouver Island to California.

C. prenanthoides Durand Jour. Acad Philad. n. ser. ii, 93. Glabrous or roughish-puberulent: stem erect, 1-3 feet high: leaves numerous, 6-18 lines long, from ovate-oblong to lanceolate, the cauline mainly sessile: flowers racemose, scattered or clustered, generally numerous, bright blue, on short pedicels: corolla slender-cylindrical in bud, twice the length of the slender calyx-lobes, almost 5-parted, its lobes narrowly lanceolate, 2-4 times as long as the tube: capsule thin-walled and with broad and retuse base. Coniferous woods and open places, southern Oregon to California.

ORDER LIV, VACCINIACEÆ Lindl. Veg. Kingd. 757.

Shrubs or small trees, with alternate simple leaves, and small pink or white perfect flowers in clusters, or solitary. Calyx-tube adnate to the ovary, the limb 4-5-lobed or 4-5-cleft. Corolla gamopetalous, 4-5-lobed, or rarely divided into separate petals, deciduous. Stamens twice as many as the lobes of the corolla, epigynous, or inserted on the base of the corolla; filaments usually flattened, anthers dorsally attached, 2-celled, the connective entire or 2-awned. Ovary inferior, 2-10-celled, with placentae in the axis, with one to several anatropous ovules in each cell, crowned by the epigynous disk. Style filiform: stigma simple, or minutely 4-5-lobed. Fruit a berry or drupe in our genera. Seeds compressed. Embryo small, in fleshy albumen.

1 **Vaccinium** Corolla urceolate, subglobose, cylindric, or campanulate.

2 **Oxycoccus** Corolla deeply 4-cleft or 4-divided, the lobes reflexed.

1 VACCINIUM L. Sp. 349.

Branching shrubs or small trees with alternate often coriaceous leaves and small white pink or red flowers. Calyx-tube globose, hemispheric or turbinate, not angled, adnate to the ovary, the limb 4-5-toothed or lobed, persistent. Corolla urn-shaped, campanulate, cylindric, or subglobose, its limb 4-5-toothed or lobed. Stamens as many or twice as many as lobes of the corolla. Anthers awned or awnless, upwardly prolonged into tubes, opening by a terminal hole or slit of the tubular apex of each cell. Ovary 4-5-celled, or 8-10 celled by false partitions; ovules several or numerous in each cell.

§ 1 **EUVACCINIUM** Gray. Leaves deciduous. Flowers on drooping pedicels, solitary or 2-4 together, developing with or soon after the leaves. Corolla from ovate to globular, and more or less urn-shaped, 4-5-toothed. Filaments glabrous: anthers 2-awned on the back, included. Ovary and berry 4-5-celled, with no false partitions.

* Leaves quite entire and usually almost sessile: flowers 1-4 in a fascicle from a distinct scaly bud, more commonly 4-merous and 8-androus: limb of the calyx deeply 4-5-parted.

V. uliginosum stiff, much bran-
glaucous, ob-
veiny especially
ovate, solitary
diameter, sweet
across the conti-

Var. mucronatum
bright green b-
abruptly mucro-
Alaska.

V. occidentale
leaves rather th-
long or oblanceol-
tary: corolla obli-
mountain marsh-

* * **Flower**
10-androus: ca-

V. cespitosum
high: leaves fron-
ly serrulate, bri-
ovoid-oblong: b-
Mountains, Was-

Var. cuneatum
inches high, bus-
late-lanceolate an-
Columbia to Cali-

V. arbusculum
inches high, muc-
green: corolla ob-
a bloom, sweet.

+ + **Lo**

V. Myrtilloides
ovate or oval, th-
with a promin-
limb of calyx al-
Alaska to Idaho

V. microphyllum
erect, with num-
inches high: leav-
a line long: berry
est mountains, V-

+
V. membranaceum
not of Michx. G-
gled branchlets
branceous, gree-
inches long, the
the calyx entire:
icels erect in fr-
On the high mou-

Var. rigidum

V. uliginosum L. Sp. 350. Glabrous or minutely puberulent: stem stiff, much branched, 6-24 inches high: leaves thickish, mostly pale or glaucouscent, obovate oval or oblong-cuneate, obtuse or retuse, reticulate-veiny especially beneath, 5-12 lines long: corolla urn-shaped, globular or ovate, solitary or 2-4 together: berries dark blue with a bloom, 3-4 lines in diameter, sweet. Summits of the high mountains of Oregon to Alaska and across the Continent. Also in northern Europe and Asia.

Var. mucronatum Herder. Depressed-cespitose: leaves small, bright green both sides, conspicuously reticulated, usually roundish, abruptly mucronate or cuspidate. Along the coast, southern Oregon to Alaska.

V. occidentale Gray Bot. Cal. i, 451. Glabrous shrub, 1-3 feet high: leaves rather thin, glaucouscent, obscurely veiny, from oval to obovate-oblong or oblanceolate, obtuse or acutish, 6-9 lines long: flowers mostly solitary: corolla oblong-ovate: berries small, 2-3 lines in diameter. In high-mountain marshes, Washington to California and Nevada.

* * Flowers solitary in the earliest axils, usually 5-merous and 10-androus: calyx less deeply or very slightly lobed.

+ Dwarf and caespitose: branchlets not angled.

V. cespitosum Michx. Fl. i, 234. Glabrous or nearly so 3-7 inches high: leaves from obovate to cuneate-oblong, obtuse or rarely acutish thickly serrulate, bright green both sides, reticulate-veiny; corolla ovate or ovoid-oblong: berries large, blue with a bloom, sweet. On the highest Mountains, Washington to Alaska and across the Continent.

Var. cuneifolium Nutt. Proc. Am. Phil. Soc. viii, 262. Stem 8-12 inches high, bushy: leaves spatulate-cuneate with rounded apex to spatulate-lanceolate and acute, the earliest not rarely entire. Mountains of Brit. Columbia to California, Colorado, Utah and Lake Superior.

V. arbuscula. *V. cespitosum* var. *arbuscula* Gray. Stem erect, 6-18 inches high, much branched: leaves obovate, 5-7 lines long, thickish, pale green: corolla oblong-ovoid: berries 2-3 lines in diameter, dark blue with a bloom, sweet. In open pine forests, Alaska to California.

+ + Low: branches sharply angled and green: leaves small.

V. Myrtilus L. Sp. i, 349. "A foot or less high, glabrous: leaves ovate or oval, thin, shining, serrate, conspicuously reticulated-veiny, and with a prominent narrow midrib (in ours half to two-thirds inch long): limb of calyx almost entire: corolla globular-ovate: berries black, nodding. Alaska to Idaho and the Rocky Mountains. Eu., Asia."

V. microphyllum. *V. Myrtilus* var. *microphyllum* Hook. Stem erect, with numerous slender strict green branches and branchlets, 3-18 inches high: leaves ovate or oval, 2-4 lines long, bright green: corolla ovate, a line long: berries 1-2 lines in diameter, bright red, sweet. On the highest mountains, Washington to California and the Rocky Mountains.

+ + + Mostly tall with spreading branches.

V. membranaceum Dougl. Hook. Fl. ii, 32. *V. myrtilloides* Hook. ^{also} *macrophyllum* not of Michx. Glabrous or glabrate, 1-5 feet high, with erect slightly angled branchlets: leaves ovate or oval to oblong, sharply serrulate, membranaceous, green both sides but not shining, loosely reticulate-veiny, 1-2 inches long, the larger and later ones mostly acute or acuminate: limb of the calyx entire: corolla depressed-globular or semi-globose-urceolate: pedicels erect in fruit: berries 3-4 lines in diameter, purplish-black, sweet. On the high mountains, Alaska to California, and east to Lake Superior.

Var. rigidum Hook. Branchlets slightly pubescent and more com-

O. palustris Pers. Syn. i, 419. *Vaccinium oxycoccus* L. Stems very slender, creeping, rooting at the nodes, 6-18 inches long; branches erect or ascending, 2-6 inches high, very leafy: leaves thick, evergreen, ovate, acute at the apex, rounded or cordate at base 2-5 lines long, green above, white beneath, the margins revolute, entire: flowers 1-5 in a fascicle from terminal thin-scaly buds, nodding on erect long filiform 2-bracteolate pedicels: corolla pink, about 4 lines broad, cleft nearly to the base; filaments fully half as long as the anthers: berries globose, 3-5 lines in diameter, often spotted when young. In cold bogs, Oregon to and around the sub-Arctic Zone.

Var. intermedium. *Vaccinium Oxycoccus* var. *intermedium* Gray. Leaves from ovate to oblong, mostly obtuse, 3-6 lines long: flowers strictly umbellate from the scaly bud, but this not rarely proliferous into a leafy shoot: berries 3-5 lines in diameter. Cold bogs in the Cascade Mountains, Oregon to Brit. Columbia.

ORDER LV. ERICACEÆ DC. Fl. Franc. iii, 675.

Shrubs trees or herbs with simple leaves without stipules, and mostly perfect flowers. Calyx inferior, free from the ovary, 4-5-parted or 4-5-cleft, mostly persistent. Corolla regular, or rarely somewhat irregular, usually 4-5-toothed or 4-5-lobed. Stamens hypogynous, usually as many or twice as many as lobes or divisions of the corolla: filaments mostly separate and free or nearly free from the corolla: anthers 2-celled, the cells often prolonged upwardly into tubes, opening by terminal pores or chinks, or longitudinally, often awned: the pollen composed of 4 united grains. Ovary 2-5-celled with placentae in the axis, the ovules usually numerous, sometimes solitary, anatropous: style single: stigma peltate or capitate. Fruit a capsule berry or drupe. Embryo small or minute, in fleshy albumen.

TRIBE I, ARBUTEÆ Fruit a berry or berry-like drupe. Corolla 4-5-toothed, deciduous.

1 **Arbutus** Ovary 5-celled, many-ovuled: fruit a many-seeded berry.

2 **Arctostaphylos** Ovary 5-10-celled, with a single ovule in each cell: fruit a 5-10-seeded drupe, or by abortion 3-9-seeded.

TRIBE II, ANDROMEDEÆ Fruit a loculicidal, chiefly 5-celled and many-seeded capsule. Corolla usually 5-toothed, deciduous.

* Calyx becoming fleshy and berry-like in fruit, enclosing the small capsule.

3 **Gaultheria** Corolla campanulate and 5-lobed, or urceolate, 5-toothed.

** Calyx remaining dry under the naked capsule.

4 **Andromeda** Low shrubs with moderately broad leaves: calyx valvate or open in bud: corolla from globular-urceolate to cylindraceous: capsule 5-celled.

5 **Cassiope** Small fruticulose plants with small thick or acerose mostly imbricated leaves: calyx of ovate imbricated sepals: corolla open-campanulate, 4-5-lobed or parted: capsule 4-5-valved, the valves 2-lobed.

TRIBE III, RHODOREÆ Fruit a septicidal capsule, the valves in dehiscence separating from the persistent placentiferous col-

umella. Corolla deciduous, its lobes or petals imbricated in bud.

* Anthers opening by a pore or chink at the apex of each cell.

+ Corolla gamopetalous: scaly leaf-buds none: flowers from the axils of mostly coriaceous-follicleous persistent bracts: capsule globular, 4-5-valved from above.

6 *Phyllocladus* Leaves narrow and imbricated: corolla ovoid.

7 *Bryanthus* Leaves narrow, alternate but crowded: corolla open-campanulate, 5-lobed or parted.

8 *Kalmia* Leaves comparatively broad and ample, persistent: corolla saucer-shaped, 5-lobed and 10-saccate below the limb.

+ + Flower-buds scaly-strobilaceous, the thin or scarious scales caducous or deciduous: corolla gamopetalous: capsule 4-5-valved from apex to base.

9 *Menziesia* Shrubs with deciduous leaves: corolla from globular-urceolate to cylindraceous, 4-toothed or lobed: stamens not exerted.

10 *Azaleastrum* Shrubs with deciduous leaves: corolla subcampanulate, regular, 5-lobed: stamens not exerted.

11 *Azalea* Shrubs with deciduous leaves: corolla funnelliform, slightly irregular: stamens exerted.

12 *Rhododendron* Shrubs with evergreen leaves: corolla campanulate, slightly irregular.

+ + + Corolla polypetalous or very nearly so.

13 *Ledum* Shrubs with evergreen leaves: flowers umbellate from separate scaly buds: capsule 5-valved from the base.

** Anthers opening from the apex nearly or quite to the base of the cell: corolla of distinct petals or deeply 5-cleft: capsule 2-5-valved from above.

14 *Cladanthus* Erect shrubs with deciduous leaves: flowers from leafy shoots of the season, solitary: capsule 5-6-celled.

Tribe 1 Arbutæ DC. vii 581. Trees or shrubs with scaly buds and alternate evergreen leaves. Corolla urn-shaped or globular, 5-toothed or rarely 4-toothed, deciduous. Stamens twice as many as lobes of the corolla, included. Fruit fleshy, either a berry or drupe.

1 ARBUTUS L. Gen. n. 552. (MADRONO).

Low trees or shrubs with thick evergreen leaves and small pink or white flowers in panicles that terminate the branchlets. Calyx small, 5-lobed, persistent. Corolla ovate, globular, or urn-shaped, 5-toothed, the teeth recurved. Stamens 10, included: anthers flattened, furnished with a pair of reflexed awns on the back below the summit; the cells opening by terminal pores. Ovary raised on a hypogynous disk, 5-celled: ovules numerous on a fleshy placenta projecting from the inner angle of each cell. Style rather long: stigma obtuse. Berries with a rough or granular surface, maturing several seeds in each cell.

A. *Menziesii* Pursh. Hook. Fl. ii, 36. A tree 20-100 feet high, and

trunk 6-30 inches
large trees becoming
oval or oblong, entire
leaves and finely reticulate
membraneous: berries
obovate, above
slightly drupaceous
des, Vancouver I.

2 ARCTOSTAPHY

Shrubs or small
leaves which are
small white to lilac
racemes or panicles
deeply 5-parted.
Stamens 8 or 10
with 2 reflexed
at the top. Ovary
each cell, in fruit
reddish stone or
rescent at the vertex
and small cotyledons

* Depressed
pubescent, no bracts
ovary and fruit

A. *Uva-ursi* L.
branched and root
diameter from a
inch or less
slightly foliaceous
restricted at the top
5 lines in diameter
California to the A

A. *intermedia*
varieties of the stem
erect, leaves
long, obtuse,
lowered: fruit globose
7, firmly consilient

A. *Nevadensis*
at the base, the branches
obovate-spatulate
racemes few
all red, 3-4 lines
mountains, Washington

** Erect low
mostly clustered

A. *hispidula*.
rather strictly branched
leaves oblong or obovate
reticulate margins
with round pubescent
at the base, acuminate

trunk 6-30 inches in diameter: bark close and smooth by exfoliation, on large trees becoming rough near the base, turning brownish-red: leaves oval or oblong, entire or serrulate, green with more or less red veins above, pale and finely reticulated beneath, 3-5 inches long by 1-3 inches broad, coriaceous: branches of the panicle minutely pubescent: calyx-lobes broadly ovate, about a line long: corolla globular, 3-5 lines long: berries somewhat drupaceous, reddish-orange, 3-5 lines in diameter. On dry hillsides, Vancouver Island to southern California: west of the Cascade Mts.

2 ARCTOSTAPHYLOS Adans. Fam. Pl. ii, 165. (MANZANITA.)

Shrubs or small trees with alternate broad coriaceous evergreen leaves which are usually vertical by a twist of the petiole, and small white to light red flowers in terminal, usually pendulous, racemes or panicles. Pedicels bracteate and bracteolate. Calyx deeply 5-parted. Corolla urn-shaped, with 4 or 5 recurved lobes. Stamens 8 or 10; filaments dilated and hairy at base; anthers with 2 reflexed awns on the back, the cells opening by a hole at the top. Ovary 4-10-celled, with a single pendulous ovule in each cell, in fruit becoming a 4-10-celled, and by abortion, 1-7-celled stone or patumen, or the cells distinct or more or less coescent at the ventral edge. Seeds with a slender erect radical and small cotyledons in fleshy albumen.

* Depressed and trailing or creeping, green, glabrous or minutely pubescent, no bristly hairs: flowers rather few in simple small clusters: ovary and fruit glabrous: nutlets 1-nerved on the back.

A. *Uva-ursi* Spreng. Syst. ii, 287. (KINNIKINIC.) Diffusely much branched and rooting at the nodes, forming depressed patches several feet in diameter from a single main root: leaves oblong-spatulate, obtuse or resee, an inch or less long, tapering into a short petiole, bracts ovate, acute, somewhat foliaceous: flowers few, in short racemes, white; corolla ovoid, restricted at the throat, about 2 lines long: drupe globose, red, glabrous, 5 lines in diameter, containing 5 coalescent nutlets. In open woods, California to the Arctic Circle and across the Continent.

A. *intermedia* Greene Pitt. ii, 171. Diffusely branching, the main divisions of the stem procumbent, a foot or two long; leafy branches ascending or erect, less than a foot high: leaves obovate-cuneiform, about an inch long, obtuse, puberulent beneath: racemes terminal, subsessile, few-flowered: fruit globose, slightly depressed, 3-4 lines in diameter; nutlets 7, firmly consolidated. On dry gravelly ground, Mason Co. Washington.

A. *Nevadensis* Gray Syn. Fl. ii, 27. Stems loosely branching from the base, the branches decumbent, 1-2 feet long: leaves ovate or oval to lanceolate-spatulate, cuspidate-mucronate, abruptly petioled, 6-12 lines long: racemes few-flowered: corolla white, oblong, 2-4 lines long: drupes all red, 3-4 lines in diameter: nutlets mostly separate. On the high mountains, Washington to California.

* * Erect low shrubs: leaves at most an inch long: flowers on short, mostly clustered, racemes or spikes, only a line or two long.

A. *hispidula*. Stems 4-6 feet high, with very dark colored bark, either strictly branched; branchlets glandular-hispidulous, very leafy: leaves oblong or oblong-ovate or some oblong-lanceolate, with indistinct cartilaginous margins acute at both ends, cuspidate, green and glabrous, with round pubescent petioles: bracts glabrous, triangular with a very broad base, acuminate, not foliaceous: pedicels glabrous, longer than the

bracts: corolla rose-color, 2-3 lines long: filaments sparingly hairy: ovary glabrous: fruit not seen. On bottom lands along Smith river at Gasque Del Norte Co. California: no doubt in adjacent Oregon.

A. intricata. Stem erect, 3-6 feet high with very dark-colored bark irregularly and intricately branched, the branchlets tomentose and glandular: leaves oblong to ovate, acute and cuspidate, usually abruptly contracted below to a short glandular-hispid petiole, bright green, minutely tomentose, the margins ciliate: bracts acuminate-ovate with a broad base, hispid-ciliate, somewhat foliaceous: pedicels very short, glandular: corolla bright rose-color, about 3 lines long: filaments loosely hairy: ovary densely tomentose: fruit not seen. On stony hillsides near Smith river west of Gasque, Del Norte Co. California: no doubt in adjacent Oregon.

A. cinerea. Erect, 3-6 feet high, densely branched from the base, with rather light-colored bark and cinereous branchlets: leaves oblong or obovate, obtuse or acutish to acute, cuspidate, whitish-green, tapering below to a stout flat cinereous petiole, smooth: bracts not foliaceous, acuminate-lanceolate with a broad base, minutely cinereous: pedicels longer than the bracts, minutely tomentose: corolla dark rose-color to nearly white: filaments densely hairy: ovary hairy at the top: fruit globose, flattened at each end: some of the nutlets coalescent. Rocky hillsides along the eastern base of the Coast Mountains near Waldo, Oregon.

*** Erect shrubs or low trees: leaves 1-3 inches long: flowers 3-4 lines long, on short clustered racemes: drupes obcompressed-globose: some of the nutlets coalescent.

A. oblongifolia. Densely branching from the base, with reddish-brown bark and cinereous branchlets, 4-6 feet high: leaves oblong or the lowest obovate, obtuse, cuspidate, usually abruptly contracted below to a rather long round petiole, whitish-green, smooth: bracts somewhat foliaceous, acuminate-lanceolate with a broad base, minutely pubescent: pedicels longer than the bracts, minutely pubescent and sparingly glandular: corolla white tinged with red: filaments very sparingly if at all hairy: ovary pubescent at the top. Rocky hillsides, eastern base of the Coast Mountains near Waldo, Oregon.

A. parvifolia. Stems branching from the base, with light reddish-bark and minutely white-tomentose branchlets: leaves small, oblong or cuneate-oblong, obtuse or acutish, minutely cuspidate, whitish-green, on flattish petioles: bracts triangular, short-acuminate, minutely pubescent: pedicels not longer than the lower bracts, minutely pubescent: filaments sparingly hairy: ovary glabrous. On the high hills near Andersons, Josephine Co. Oregon.

A. pulchella. Arborescent, 6-12 feet high, branching from the base with dark-colored bark and minutely pubescent branchlets: leaves oblong to oblong, obtuse, obscurely mucronate, smooth, cinereous-green: bracts acuminate-ovate with a very broad base, minutely pubescent: pedicels much longer than the bracts, sparingly glandular: filaments slightly hairy: ovary glabrous. On the mountains of Josephine Co. Oregon.

A. viscidula Parry Proc. Cal. Acad. ii, 496. Arborescent, intricately branched from the base, with dark-colored bark and glabrous branchlets: leaves orbicular to ovate or oblong, acutish to rounded at the apex, with or without a small cusp, ashy-green and glabrous: bracts broadly triangular, shortly acuminate: pedicels much longer than the bracts, densely viscid-glandular: filaments densely hairy: ovary glabrous. Common in Josephine and Jackson Counties Oregon and adjacent California.

A. Manzanita Parry l. c. ? Arborescent, 6-10 feet high, with reddish-brown bark and the young branchlets black-glandular: leaves ovate to

obovate, obtuse or petiole, not at all acuminate-lanceolate: glabrous: filaments mountains and so

A. bracteata. tomentose branchlets: pedicels pubescently hairy. N

A. strigosa. white-tomentose, usually rounded and aptly contracted: strigose pubescent: sparingly hairy: ovary Oregon.

A. tomentosa. with tomentose and acute and cuspidate: hispid and tomentose and ciliate: sparingly hairy: ovary Columbia to Oregon.

Tribe ii, Andromeda ternate evergreen: leaves twice as many as male: anthers opening: many-seeded capsule: separate from the

Shrubs or undeciduous flowers: calyx 5-cleft or 5-lobed. Stamens usually 2-petaled. Capsule 5-lobed at maturity: fleshy and berry-like.

* Corolla short: the anthers obscure.

G. Myrsinites. leaved, glabrous, rounded, mostly 3-5-bracteolate: fruit scarlet. Washington

G. ovatifolia G. pendulous branches: leaves broadly ovate, serrulate, dar

ovate, obtuse or acutish, usually abruptly contracted below to a slender petiole, not at all cuspidate, glabrous, dark green both sides: bracts acuminate-lanceolate, green and glandular: pedicels shorter than the bracts, glabrous: filaments tomentose: ovary glabrous. Top of the Siskiyou mountains and southward.

A. bracteata. Strictly branched from the base, 4-6 feet high, with tomentose branchlets: leaves oblong, obtuse, obscurely cuspidate, minutely tomentose, contracted below to a flattish petiole: bracts foliaceous, lanceolate: pedicels pubescent, shorter than the bracts: filaments and ovary densely hairy. Near Waldo, Josephine Co. Oregon.

A. strigosa. Erect and loosely branching, 8-10 feet high, with dense, white-tomentose branchlets: leaves oblong or ovate, obscurely cuspidate, usually rounded at the apex, minutely white-tomentose, light green, abruptly contracted below to a round petiole: bracts foliaceous, lanceolate, strigose pubescent: pedicels shorter than the bracts, pubescent: filaments sparingly hairy: ovary densely pubescent. In the mountains of Josephine Co. Oregon.

A. tomentosa Dougl. Lindl. Bot. Reg. t. 1791. Erect, 2-10 feet high with tomentose and setose-hispid branchlets: leaves oblong-ovate or oblong, acute and cuspidate, densely tomentose, contracted below to a short setose-hispid and tomentose petiole: bracts foliaceous, narrowly lanceolate, tomentose and ciliate: pedicels shorter than the bracts, tomentose: filaments sparingly hairy: ovary densely tomentose. Rocky and sandy places, British Columbia to Oregon and perhaps farther south.

Tribe ii, Andromedæ DC. Prodr. vii, 588. Shrubs with chiefly alternate evergreen leaves. Corolla gamopetalous, deciduous. Stamens twice as many as lobes of the corolla, more or less included. Anthers opening at the top. Fruit a loculicidal chiefly 5-celled and many-seeded capsule, the valves usually bearing the partitions, which separate from the persistent placentiferous axis or columella.

3 GAULTHERIA L. Gen. n. 551.

Shrubs or undershrubs with broad evergreen leaves, and small nodding flowers either solitary in the axils, or in axillary racemes. Calyx 5-cleft or lobed, persistent. Corolla urn-shaped to campanulate. Stamens 10: filaments dilated toward the base: anthers usually 2-pointed or 2-awned, and opening by a pore at the top. Capsule 5-celled, depressed and umbilicate, many-seeded, enclosed at maturity in the calyx, which enlarges and becomes fleshy and berry-like after the corolla falls.

* Corolla short-campanulate, 5-lobed: filaments glabrous: apex of the anthers obscurely 4-pointed.

G. Myrsinites Hook. Fl. ii, 35, t. 129. Cespitose-procumbent or depressed, glabrous, the flowering branches 1-5 inches long: leaves oval or rounded, mostly only half-inch long: pedicels solitary in the axils, very short, 3-5-bracteolate: corolla depressed-campanulate, little surpassing the calyx: fruit scarlet, 2-3 lines in diameter. In forests on the high mountains, Washington to California and the Rocky Mountains.

G. ovatifolia Gray Proc. Am. Acad. xix, 84. Depressed-trailing with ascending branches, with some at length rusty hairs, at least on the calyx: leaves broadly ovate, or even subcordate, the largest an inch and a half long, serrulate, dark green and shining; corolla campanulate, twice the

length of the calyx-lobes: pedicels solitary in the axils, usually 4-bracteate: fruit scarlet. Cascade Mountains, Oregon to Brit. Columbia.

* * Corolla ovate or urceolate, 5-toothed: filaments hairy: anthers 4-awned at the summit.

G. Shallon Pursh Fl. i, 284, t. 12. (SALAL) Shrubby, 1-6 feet high with rather stout spreading stems: branches, pedicels and even the corolla glandular-hairy or pubescent: leaves ovate to cordate, often acuminate, strongly serrulate, 1-4 inches long: flowers in open bracteate many-flowered secund racemes, from axillary and terminal chartaceous-scaly buds: pedicels 2-bracteolate below the middle: corolla urn-shaped, 3-5 lines long, 5-toothed, viscid: fruit black, 3-6 lines in diameter, edible. Very common in forests, Alaska to California.

4 ANDROMEDA L. Sp. 393.

Low shrubs with coriaceous, linear or oblong evergreen leaves and small white to flesh-colored flowers in terminal umbels. Calyx deeply 5-parted, persistent but not becoming fleshy in fruit. Corolla globose-urceolate, 5-toothed, the teeth recurved. Stamens 10, included; filaments hairy; anthers attached to the filament at about the middle, ovate, obtuse, the cells opening by large terminal pores, each with a recurved awn. Ovary 5-celled. Capsule subglobose, 5-angled, the top intruded, loculicidally 5-valved, many-seeded. Placenta borne near the top of the columella, the seeds spreading in all directions.

A. polifolia L. l. c. Stem 6-18 inches high, simple or branched, leaves firm-coriaceous, glabrous and glaucous, linear to lanceolate-oblong with strongly revolute margins, white beneath: flowers in a small terminal umbel: pedicels from the axils of ovate persistent scaly bracts, naked: calyx small, deeply 5-parted, early open; corolla globose-urceolate, 3-5 lines long: anthers short, each cell surmounted by a slender ascending awn: seeds smooth and shining. Wet bogs, northern Washington to Alaska and across the Continent.

5 CASSIOPE D. Don Edinb. New Phil. Journ. xvii, 157.

Fruticulose evergreens with small or minute imbricated or crowded, entire and veinless, often opposite or whorled leaves and solitary flowers nodding on the summits of erect naked pedicels. Calyx ebracteolate, of 4 or 5 imbricated sepals that are thickened at base. Corolla open-campanulate, 4- or 5-lobed or 5-parted. Anthers short, attached nearly by their summits, the cells each opening by a large terminal pore, and tipped by a slender recurved awn. Style thickened at base, or conical, the ovary centæ many-ovuled, pendulous from the summit of the short columella. Capsule globose or ovoid, dry, loculicidally 4- or 5-valved, the valves 2-cleft. Seeds minute, with a thin close coat.

C. Stelleriana DC. Prodr. vii, 610. Diffusely spreading: leaves oblong-linear, obtuse, widely spreading, flattish, obscurely serrulate, 2-3 lines long: peduncle terminal, very short: corolla 4- or 5-parted: style conical. Washington to Alaska.

C. lycopodioides Don l. c. Stems filiform, very low and creeping, leaves barely a line long, roundish on the back, not ciliate, closely imbricated.

located in 4 ranks, thickened down the middle. Islands and Sib.

C. Mertensiana and fastigiate branches, carinate and not rather short: corolla On the highest

C. tetragona with fastigiate branches, row on the back of the flowers sometimes slightly thicker. Oregon to the A.

Tribe 3, RHODODENDROIDEÆ imbricated in the corolla, ma not rarely capsular: the valves persistent placentiferous.

* Anthers 4-awned. + Flowers corolla or rarely from the axils. Filaments and style from above.

Low branches, evergreen leaves, umbels. Pedicels cent. Corolla 5-lobed, 10, included. Ovary 5-celled, obscurely 5-lobed, oblong, 5-valved, coriaceous.

P. glandulifera fastigiate branches, somewhat spreading, a white line through the middle of the base to a short line long, glandular lines long, glaucous, the short lobes green. Oregon to Alaska.

Small evergreen leaves and showy, dense-crowded at

erated in 4 ranks: pedicels filiform: corolla 5-lobed: style slender, slightly thickened downward. In the Blue Mountains of Oregon to the Aleutian Islands and Siberia.

C. Mertensiana Don l. c. Rather stout, with rigid ascending stems and fastigiate branches, a foot or less high: leaves 1-2 lines long, glabrous, carinate and not furrowed on the back, imbricated in four ranks: pedicels rather short: corolla 5-lobed: style slender, slightly thickened downward. On the highest mountains, California to Alaska and the Rocky Mountains.

C. tetragona Don l. c. Stems erect or ascending 4-12 inches high, with fastigiate branches: leaves 1-2 lines long, thick and with a deep furrow on the back, imbricated in four ranks, often pubescent when young: flowers sometimes four-merous: peduncles 5-12 lines long: style slender, slightly thickened below. Higher parts of the Cascade Mountains in Oregon to the Arctic regions and across the Continent.

Tribe 3, Rhodoreæ Don. *Corolla deciduous, its lobes or petals imbricated in the bud. Anthers without awns or appendages. Stigma not rarely surrounded by a ring or border. Fruit a septidial capsule: the valves (in ours) in dehiscence separating from the persistent placentiferous columella.*

* *Anthers opening by a pore or chink at the apex of each cell.*

— *Flowers from the axils of coriaceous-foliaceous persistent bracts, or rarely from those of ordinary leaves. Corolla gamopetalous. Filaments and style filiform. Capsule globular, 4- or 5-valved from above.*

6 PHYLLODOCE Salisb. Parad. Lond. t. 36.

Low branching more or less glandular shrubs with small linear evergreen leaves and white to purple or blue flowers in terminal umbels. Pedicels bracted at the base. Calyx 5-parted, persistent. Corolla ovoid, contracted at the throat, 5-toothed, Stamens 10, included: filaments filiform; anthers attached by their backs, oblong, obtuse, the cells opening by terminal oblique chinks. Ovary 5-celled; ovules numerous; style filiform, included; stigma obscurely 5-lobed or capitate. Capsule subglobose or globose-oblong, 5-valved to about the middle. Seeds minute, the testa coriaceous.

P. glanduliflora. Bryanthus glanduliflorus Gray. Stems rather rigid, fastigiate, branched, 3-12 inches high: leaves numerous and crowded but somewhat spreading, linear-oblong, obtuse, 3-6 lines long, thick, with a white line through the centre below and a deep furrow above, narrowed at base to a short petiole, the margins thick and scabrous: pedicels 6-12 lines long, glandular-hirsute: sepals lanceolate, acutish to acuminate 2 lines long, glandular-hirsute: corolla yellowish, ovoid, 3-4 lines long, the short lobes glabrous. On rocky banks and cliffs near perpetual snow, Oregon to Alaska and the Rocky Mountains.

7 BRYANTHUS Gmel. Fl. Siber. iv, 132.

Small evergreen shrubs with much crowded, linear alternate leaves and showy rose-color to purple flowers umbellate or racemose-crowded at the ends of the branches, Calyx 4-6-toothed or

parted, persistent. Corolla campanulate, 4-6-lobed, the lobes short, recurved, simply imbricated in bud. Stamens 8-12: filaments filiform: anthers oblong, opening by oblique chinks at the top. Capsule subglobose, 4-6-celled. Seeds small, with a firm coat.

B. empetriformis Gray Proc. Am. Acad. vii, 377. Densely much branched from the base, 1-2 feet high, often forming clumps 1-3 feet in diameter: leaves 3-7 lines long, with strongly revolute thickened and rough margins: pedicels several, somewhat umbellate, subtended by foliaceous and rigid bracts: corolla rose-color, 2-4 lines long, campanulate, barely 5-lobed, the lobes much shorter than the tube: stamens included. On the highest mountains, northern California to Vancouver Island and the Rocky Mountains.

8 KALMIA L. Gen. n. 545.

Shrubs with entire evergreen coriaceous leaves and umbellate clustered or rarely scattered showy flowers. Calyx 5-parted of 5 sepals, imbricated in the bud. Corolla saucer-shaped, with a short narrow tube, 5-lobed and 10-saccate below the limb, which is strongly 10-carinate in the bud from the pouches upward, the salient keels running to the summit of the lobes and sinuses, the limb imbricated in the bud. Stamens 10; the short anthers free and on erect filaments in the early bud, in the full grown bud received in the pouches of the corolla and the filaments bent over as the corolla enlarges and still more when it expands, straightening elastically and incurving when disengaged, thereby throwing out the pollen. Anther-cells opening by a large pore; sometimes extending into a chink. Stigma depressed. Capsule globose, 5-celled, tardily septicial. Placentæ pendulous or porrect from the upper part of the small columella. Seeds with a thin and mostly close coat.

K. glauca Ait. Hort. Kew. ii, 64, t. 8. Shrub 6-18 inches high, glabrous throughout and mostly glaucous: leaves all opposite, or rarely in threes, almost sessile, ovate to linear-oblong, or appearing narrower by the usually strong revolution of the margins, dark green above, glaucous white beneath, 6-20 lines long: flowers in terminal fascicles, lilac-purple, 6-8 lines in diameter; bracts large; sepals ovate, scarious-margined, much imbricated, persistent. In marshes near the coast, Oregon to Alaska and across the Continent.

Var. microphylla Hook. Fl. ii, 41. Stems 6-12 inches high: leaves oval barely half-inch long: flowers only 2-6 in the clusters, smaller. High mountain marshes, California to Brit. Columbia.

— — — *Buds scaly-strobilaceous; the thin or scarious scales caducous or deciduous. Calyx often much reduced or obsolete. Corolla gamopetalous. Capsule 4- or 5-valved from apex to base. Seeds mostly scobiform, having the loose coat produced or appendaged at both ends.*

9 MENZIESIA Smith Incon. Ined. iii. t. 36,

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colored flowers on nodding pedicels, developed at the same time as the leaves from separate strobilaceous buds that terminate the branches of the preceding year. Calyx bristly-hirsute, usually 5-lobed. Corolla from globular-urceolate to cylindraceous, 4-toothed or lobed. Stamens not exserted, usually 8: filaments subulate: anthers mostly linear-sagittate, the cells opening by an oblique pore or short chink. Style not exserted: stigma truncate. Capsule short. Placentæ attached to the whole length of the short columella.

M. ferruginea Smith l. c. Erect straggling shrub 6-8 feet high with strigose chaffy ferruginous scales on the young parts: leaves oblong or lanceolate-obovate, acute or acutish at both ends, prominently glandular, mucronate, ciliate with glandular bristles, rusty strigose-hirsute above, merely glabrous beneath: pedicels bristly-glandular: corolla oblong-ovate, becoming cylindraceous: filaments glabrous: capsule ovate: seeds merely apiculate, or very short tail ed. In the high mountains and along the coast; Oregon to Alaska.

M. glabella Gray Syn. Fl. ii, 39. Erect shrub 6-8 feet high, without strigose chaffy scales, or very few on the young petioles and midrib beneath: leaves obovate, mostly obtuse, barely mucronate-tipped, glaucescent and glabrous or nearly so beneath, sprinkled with some small appressed hairs above, an inch long, the obscurely serrulate margins minutely ciliolate: pedicels naked or somewhat glandular: corolla ovoid-campanulate: filaments more or less ciliate below: capsule oblong or ovoid, erect, smooth and naked or nearly so: seeds with appendages at each end as long as the nucleus. In damp forests, Oregon to Brit. Columbia and east to Lake Superior.

10 AZALEASTRUM

RHODODENDRON & *AZALEASTRUM* Maxim.

Shrubs with thin deciduous leaves, and rather large white or light-colored flowers. Inflorescence lateral, the flowers from separate 1-3-flowered lateral buds below the leaves. Bud-scales mucous. Calyx 5-parted, the divisions more or less foliaceous, persistent. Corolla almost rotate, regular, 5-lobed. Stamens 10, not declined: filaments filiform: anthers erect, opening by a hole at the apex of each cell. Style filiform: stigma capitate. Capsule 5-valved from the summit. Seeds numerous and small, with a loose chaff-like coat.

A. albiflorum. *Rhododendron albiflorum* Hook. Stems erect, 2-6 feet high with slender branches, pubescent with slender straight or silky and short glandular hairs when young, nearly glabrous in age: leaves membranaceous, oblong or narrower, obscurely undulate, 1-2 inches long, pale green: flowers 1-3 in the fascicles, nodding on short pedicels; sepals oblong, obtuse, 3-4 lines long, somewhat foliaceous: corolla open-campanulate, 8-10 lines long, 5-lobed, bright white: filaments bearded at base: stigma peltate, lobed: capsule ovoid, 3-4 lines long. On the highest mountains of northern Oregon to Brit. Columbia and the Rocky Mountains.

11 AZALEA L. Gen. n. 212.

Erect branching shrubs with alternate thin deciduous leaves, and large flowers in terminal umbels developed from scaly buds that terminate the growth of the previous year and surrounded at

the base by lateral and smaller leaf-buds. Bud-scales and bracts caducous or early deciduous. Calyx small or minute, 5-parted. Corolla funnelform, glandular-viscid outside, with narrow tube and 5-lobed, often more or less 2-lipped limb. Stamens 5, rarely 10, exserted, usually declined: anthers attached to the filaments by their backs, the cells opening by terminal pores. Style slender, declined exserted. Ovary 5-celled, many-ovuled. Capsule oblong or narrower, 5-valved from the summit. Seeds minute, with a loose chaff-like coat.

A. occidentalis T. & G. Pacif. R. Rep. iv. 116. *Rhododendron occidentale* Gray. Stems erect, 2-10 feet high, much branched: leaves obovate-oblong, nearly or quite glabrous at maturity but minutely ciliate, bright green and shining above, paler beneath, 1-2 inches long, tapering below to a short petiole, tipped with a short red gland: calyx 5-lobed, the oblong or ovate lobes glandular and ciliate, about a line long, corolla cream-white with orange stripes, 2 inches long, with conspicuous funnelform tube, slightly irregular limb and acute lobes, glandular-viscid outside: stamens 5, exserted and declined: filaments hairy below; style long-exserted, curved upward; capsule oblong, 8-12 lines long. About springs and along streams, southwestern Oregon and California.

12 RHODODENDRON L. Gen. n. 548.

Shrubs or small trees with alternate evergreen coriaceous leaves and mostly large showy white to rose-colored or purple flowers in terminal umbels or corymbs from scaly buds, the thin scales deciduous when the flowers open. Calyx small or minute, 5-lobed or 5-parted, persistent. Corolla campanulate, 5-lobed, nearly regular. Stamens usually 10, little exserted declined or equally spreading: anthers erect, attached by their backs, the cells opening by terminal pores. Capsule short or elongated, mostly woody 5-20-valved from the summit. Seeds very numerous and small with a loose chaff-like coat.

R. Californicum Hook. Bot. Mag. t. 4863. Stems 3-12 feet high with stout erect branches, glabrous: leaves broadly oblong, 3-6 inches long dark green and shining above: flowers very numerous in the fascicles: calyx minute, slightly 5-lobed: corollas large and showy, rose-colored, a little irregular, broadly campanulate more than an inch in diameter, the 5 broad lobes undulate: stamens 10, not exserted, ovary rusty-hirsute: capsule 10-18 lines long. On mountains and along the coast, California to Brit. Columbia.

R. macrophyllum Don Syst. iii, 843. "Shrub 10 to 15 feet high leaves oblong, acute at both ends, 5 to 8 inches in length, thinnish: corolla white, less than an inch long: its lobes oblong: ovary bristly hirsute Woods, Puget Sound Washington to Brit. Columbia."

— — — Corolla polypetalous or very nearly so. Filaments filiform. Placentæ borne on the summit of the persistent columella. Seed scobiform or linear.

13 LEDUM L. Gen. n. 546.

Low shrubs with alternate persistent, more or less resinous dotted slightly fragrant leaves, and fascicles of white flowers de-

veloped from scaly deciduous scales. Petals 5, widely spreading. Cells of the anthers persistent. Perianth septicidally 5-valved. Seeds slender,

* Leaves dotted with the margins striate.

L. Grœnlandicum L. erect or ascending, long, obtuse, 1-2 lines broad, umbeliferous, 10-12 lines long, 3-4 lines long across the Contin-

** Leaves lateral.

L. glandulosum L. erect high: leaves resinous atomiferous flowers numerous retuse. In wet places.

** Leaves erect distinct petals calyx apex nearly or Capsule 2-5-valved.

14 C

Erect branches solitary termin the season. Spreading petals anthers oblong quite to the base thickened at the Capsule depressed above, many-seeded.

C. campanulatum L. with few and short long, tapering to more or less striate three, from late red hairs: sepals corolla light sag into a short tube pores. High m confused with the

ORDER

Low mostly

developed from separate mostly terminal buds with well imbricated caducous scales and bracts. Calyx 5-lobed or 5-parted, persistent. Petals 5, widely spreading. Stamens 4-10: filaments filiform: cells of the anthers opening by terminal pores. Style filiform, persistent. Pedicels recurved in fruit. Capsule oval or oblong, septicidally 5-valved from the base upward: placentæ pendulous. Seeds slender, with a loose coat.

* Leaves densely tomentose beneath, the wool soon ferruginous and the margins strongly revolute: inflorescence all terminal.

L. Greenlandicum Eder Fl. Dan. t. 567. *L. latifolium* Ait. Stems erect or ascending, 1-4 feet high, the branchlets rusty-tomentose: leaves oblong, obtuse, 1-2 inches long, green and slightly rugose above: flowers 4-5 lines broad, umbellate or short-corymbose, numerous: pedicels brown-canescient, 10-12 lines long, recurved in fruit: stamens 5-7; capsule oblong, canescent, 3-4 lines long. In cold marshes, northwest Washington to Alaska and across the Continent.

* * Leaves glabrous both sides: inflorescence terminal or sometimes lateral.

L. glandulosum Nutt. Trans. Am. Phil. Soc. viii. 270. Stout, 2-6 feet high: leaves oblong or oval, 1-2 inches long, green above, white and resinous atomiferous beneath: inflorescence often compound and crowded: flowers numerous, white, 3-4 lines in diameter: calyx 5-parted: capsule oval, retuse. In wet places, California to Brit. Columbia and the Rocky Mountains.

* * Leaves entire. No thin-scaly strobilaceous buds. Corolla of distinct petals or 5-cleft. Anthers opening longitudinally from the apex nearly or quite to the base of the cells, or by terminal pores. Capsule 2-5-valved from above.

14 CLADOTHAMNUS Bong. Veg. Sitk. 37, t. 1.

Erect branching shrubs with alternate deciduous leaves and solitary terminal or axillary reddish flowers from leafy shoots of the season. Sepals 5, somewhat foliaceous, as long as the five spreading petals, persistent. Stamens 10: filaments dilated below: anthers oblong, opening longitudinally from the apex nearly or quite to the base of the cells. Style long, declined and incurved, thickened at the apex, and annulate around the discoid stigma. Capsule depressed-globose, 5-6-celled; septicidally 5-valved from above, many-seeded. Seeds oval, with a loose cellular coat.

C. campanulatus Greene Eryth. iii, 65. "Shrub 4 to 5 feet high, with few and stoutish ascending branches: leaves lanceolate, 1 to 3 inches long, tapering to a short petiole which, together with the veins beneath, is more or less strigose-hirsute with red hairs: flowers solitary or in pairs or in threes, from lateral buds, on pedicels $\frac{1}{2}$ inch long, these setose-hispid with red hairs: sepals ovate-oblong, densely ciliate with short gland-tipped hairs: corolla light salmon-color, campanulate, the petals joined together at base into a short tube; anthers opening only by a pair of large round terminal pores. High mountains of Washington and British Columbia; hitherto confused with the typical species, which belongs to Alaska."

ORDER LV A. PYROLACEÆ Agardh Cl. Pl. 18.

Low mostly evergreen perennials with petioled leaves, and

white pink or red, perfect and nearly regular flowers solitary or in racemes or corymbs. Calyx 4- or 5-lobed. Corolla very deeply 4- or 5-parted, or of 5 petals. Stamens twice as many as the divisions of the corolla. Anthers introrse in the bud, inverted when mature, opening by pores or short slits. Pollen of 4 united grains. Ovary superior, 4- or 5-celled. Style short or slender, often declined. Ovules very numerous, anatropous. Fruit a loculicidally dehiscent capsule. Seeds minute, with a loose cellular coat much larger than the nucleus.

- 1 **Pyrola** Flowers several or numerous, racemose on a scape-like peduncle: style long and usually declined.
- 2 **Moneses** Flower solitary, on a scape: style long and straight.
- 3 **Chimaphila** Flowers few to numerous, in a corymb or umbel on a leafy stem.

1 PYROLA L. Gen. n. 554.

Acaulescent or subcaulescent perennials with all radical evergreen leaves and rather small white, greenish, or red flowers in racemes on simple scaly-bracted scapes. Calyx 5-parted, persistent. Petals 5, concave, or incurved and more or less converging, sessile and deciduous. Stamens 10, declined, or straight and connivent: filaments subulate, glabrous: anthers erect in the bud, emarginate or 2-beaked at the base, mostly reversed at maturity, each cell opening by a basal but apparently apical pore. Style straight or declined: stigma annulate, 5-lobed or 5-toothed. Capsule subglobose, the apex and base intruded, 5-lobed, 5-celled, loculicidally 5-valved from the base, the valves woolly on the margins when opening.

P. minor L. Sp. 396. Scapes 6-10 inches high, 7-16 flowered: leaves orbicular to oval, rather thin, obscurely serrulate or crenulate, 9-18 lines long, rounded or slightly narrowed or subcordate at base: pedicels recurved, rather crowded: flowers white or pinkish, 3-4 lines broad: calyx-lobes mostly triangular-ovate and acute: petals orbicular, naked at the base, globose-connivent: stamens equally connivent around the pistil: anthers not narrowed below the openings: style straight, much shorter than the ovary, included: stigma large, peltate, obscurely 5-lobed. In the Cascade mountains of Oregon to Alaska and across the Continent.

P. secunda L. Sp. 396. Somewhat caulescent from a branching base: scape-like peduncles slender, 4-10 inches high: leaves ovate to oval, mostly thin, acute, or rarely obtuse at the apex, rounded or narrowed at the base: crenulate-serrate, 1-2 inches long; flowers numerous, in a second raceme: pedicels at first merely spreading, in fruit recurved: petals greenish, with a pair of glands at the base of each, campanulate-connivent: stamens equally connivent around the pistil: anthers not narrowed below the openings: style straight, as long or longer than the petals; stigma peltate, 4-lobed, the lobes at length radiately projecting beyond the border. In mountainous districts, California to Alaska and across the Continent. Europe and Japan.

P. chlorantha Swartz Act. Holm. 1810, 190, t. 5. Scapes 6-12 inches high, 3-10-flowered: leaves small, 6-12 lines in diameter, orbicular or nearly so, coriaceous, not shining, shorter than their petioles: flowers nodding, 6-7

lines broad; calyx lobes very obtuse, the apex curved downward below the opening. Brit. Columbia and Alaska.

P. elliptica flowered: leaves base, plicate-crenate, longer than their petioles, about one fourth the length of the anther-tips, curved upward, at the base and the eastern

P. rotundifolia many-flowered, long, obscurely longer than the petioles, late or ovate-lanceolate, the white or fleshy long cells, contrast at base very short. California to Alaska.

Var. incarum from flesh-colored Idaho to Alaska.

P. bracteata many-flowered, not shining above, on slender petioles, spicuous: calyx-red petals: stamens opening into a mountainous, California.

P. picta Sm. ed: leaves first blotched with white, long, from broad longer than the bracts few and white petals: stigma under the orifice wooded districts.

P. aphylla or lurid, from several to many much shorter than declined: anthers strongly declined.

Var. pauciflora at base: bracts Mountains.

2 MONESSES

A low perennial and a solitary

lines broad; calyx-lobes short, ovate, or triangular-ovate, acute or obtuse: petals very obtuse, greenish-white: stamens declined; anthers distinctly contracted below the openings, with distinctly beaked tips: style declined, and toward the apex curved upward, longer than the petals. In dry woods, Idaho to Brit. Columbia and the northern States.

P. elliptica Nutt. Gen. i, 273. Scapes 6-10 inches high, loosely 7-16-flowered: leaves elliptic to oval, 1-2 inches long, acute or merely roundish at base, plicate-crenulate with very low teeth, membranaceous, dark green, longer than their petioles: calyx-lobes ovate-triangular, acute or acuminate, about one fourth as long as the greenish-white, obtuse petals: stamens declined: anther-tips hardly if at all beaked: style declined, and toward the apex curved upward, exserted. In rich, mostly dry woods, Idaho to Brit. Columbia and the eastern States.

P. rotundifolia L. Sp. 396. Scapes 6-20 inches high, several to many-flowered, scaly-bracteate: leaves orbicular or broadly oval, 1-2 inches long, obscurely crenulate or entire, shining above, coriaceous, mostly shorter than the petioles: bracts lanceolate or ovate-lanceolate: calyx-lobes lanceolate or ovate-lanceolate, lax or with spreading tips, usually half as long as the white or flesh-colored obtuse petals: stamens declined; anthers with long cells, contracted into a very short neck under the openings, the mucro at base very short or obsolete: style declined and exserted. In dry woods, California to Alaska and the eastern States.

Var. incarnata DC. Prodr. vii, 773. "A rather small form: flowers from flesh-color to rose-purple: calyx-lobes triangular-lanceolate." Bogs, Idaho to Alaska and northern New England.

P. bracteata Hook. Fl. ii 49. Scapes 10-16 inches high, usually many-flowered, scaly-bracteate: leaves oval to ovate or oblong, acutish, not shining above, often variegated with whitish bands, 1-3 inches long, on slender petioles: bracts broadly lanceolate, acuminate, large and conspicuous: calyx-lobes acuminate-lanceolate, more than half as long as the red petals: stamens declined; anthers with long cells contracted under the openings into a short neck: style declined, exserted. In wet places in the mountains, California to Brit. Columbia.

P. picta Smith Rees Cycl. xxix. Scapes 6-12 inches high, 7-16-flowered: leaves firm-coriaceous, dull-colored or whitish, commonly veined or blotched with white above, pale or sometimes purplish beneath, 1-3 inches long, from broadly ovate to spatulate or narrowly oblong, the blades all longer than their petioles: rootstock rigid and often branched or clustered: bracts few and short: calyx-lobes ovate, not half the length of the greenish-white petals: stamens little if at all declined: anthers with a distinct neck under the orifice: style strongly declined. Under Pine trees in sparsely wooded districts, Nootka Sound to California, Idaho, Wyoming and Utah.

P. aphylla Smith l. c. Scapes 8-12 inches high, strictly erect, reddish or lurid, from deep scaly-toothed branched rootstocks, usually leafless, several to many-flowered: bracts subulate: calyx-lobes ovate, acute, very much shorter than the obovate whitish petals: stamens but slightly if at all declined: anthers tubular-beaked under the orifice: style almost straight, strongly declined. In coniferous woods, Alaska to California.

Var. paucifolia. With or without one or two small orbicular leaves at base: bracts larger, broadly lanceolate. In dense forests of the Cascade Mountains.

2 MONESES Salisb. in S. F. Gray Nat. Arr. Brit. Pl. ii, 403.

A low perennial with opposite or verticillate evergreen leaves and a solitary drooping white or pink flower at the summit of a

slender scape. Calyx 4-5-parted, persistent. Petals 4 or 5 widely spreading, sessile. Stamens 8 or 10, glabrous: anthers 2-beaked at the base, reversed when mature, each cell opening by a basal but apparently apical pore. Style straight: stigma peltate, large, with 4 or 5 narrow lobes. Capsule subglobose, 4-5-lobed, 4-5-celled, loculicidally 4-5-valved from the summit; the valves glabrous on the margins. Seeds numerous, minute, the testa reticulated, produced at both ends.

M. uniflora Gray Man. 273. Stem very short and decumbent, leafy: leaves orbicular to ovate, petioled, serrulate, 6-20 lines long: scape 2-4 inches high: flower white to rose-color, 6-10 lines broad: calyx-lobes ovate obtuse, about one-fifth the length of the broadly ovate or orbicular petals: capsule erect, 3-4 lines in diameter. In forests, Oregon to Alaska and across the Continent. Europe and Asia.

3 CHIMAPHILA Pursh Fl. i, 279.

Low perennials with opposite or verticillate evergreen leaves and spreading or nodding white or purplish flowers in terminal corymbs. Calyx 5-parted or 5-cleft, persistent. Petals 5, concave, sessile, spreading or recurved. Stamens 10; filaments short, dilated, and mostly hairy in the middle; cells of the anthers oblong, with a short narrow neck. Style very short, obconic immersed in the umbilicate summit of the globose ovary: stigma orbicular-peltate, barely 5-crenate. Capsule erect, globose, 5-lobed, 5-celled, loculicidally 5-valved from the top, the valves not woolly on the margins. Seeds very numerous, the testa reticulated, produced at both ends.

C. umbellata Nutt. Gen. 1, 274. Stem stout, 4-12 inches high, very leafy, often branched: leaves cuneate-oblongate with tapering base, sharply serrate, not spotted, bright green and shining, 1-3 inches long: flowers several, umbellate or subcorymbose, white or pinkish: bracts narrow, deciduous: filaments hairy on the margins only. In dry woods, California to Alaska and across the Continent.

C. Menziesii Spreng. Syst. ii, 317. Slender, 3-10 inches high, sparingly branched from the base: leaves from ovate to oblong-lanceolate, acute at both ends, small, sharply serrate, the upper surface often mottled with white: peduncle 1-3-flowered: bracts ovate or roundish: filaments slender, with a round dilated portion in the middle villous: flowers about half-inch in diameter; petals dull white. In forests, California to Brit. Columbia.

ORDER LVI. MONOTROPACEÆ Lindl. Nat. Syst. ed. 2, 219.

Leafless fleshy herbs with the flowers in spikes, racemes, capitata, or solitary. Flowers regular and perfect. Calyx of 2-6 erect lobes or segments or imbricated sepals, free from the ovary. Corolla 4-5-lobed, or of 3-6 petals, rarely wanting, imbricated. Stamens 6-12, hypogynous: filaments equal, distinct, or connate at base: anthers 2-celled, or confluent 1-celled, attached to the filaments by the back or base, opening by longitudinal slits: pollen grains simple. Style short or longated: stigma capitate or peltate. Ovary superior, 4-6-

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Sarcodes Cr
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Monotropa C
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lobed, 1-6-celled; with the placentæ projecting from a central columella, or parietal and 2-lamellate: ovules numerous, anatropous. Fruit a loculicidally 4-6-valved many-seeded capsule. Seeds minute, the testa reticulated.

TRIBE I. Ovary 4-5-celled, with the placentæ on a thick central columella.

Allotropia Calyx of 5 roundish marcescent sepals, corolla wanting.

Pterospora Calyx deeply 5-parted: corolla globular-urceolate.

Sarcodes Calyx of 5 erect persistent sepals: corolla cylindraceous-campanulate.

Monotropia Calyx of 2-4 deciduous sepals: petals 5-6, not saccate at base, tardily deciduous.

Hypopitys Sepals 3-5, commonly as many as petals: petals saccate at base.

TRIBE II. Ovary 3-celled or spuriously 4-5-celled; the 4 or 5 placentæ parietal and 2-lamellate.

Pleuricospora Calyx complete, of 4 or 5 scale-like fimbriate-laciniate sepals: corolla of 4 or 5 plain petals: ovary strictly 1-celled.

Newberrya Calyx incomplete, of 2 bract-like entire sepals: corolla tubular-urceolate 4-5-lobed, marcescent: ovary spuriously 5-celled.

Tribe I Eumonotropææ Gray Syn. Fl. ii, 18. Ovary 5-celled, or sometimes 4-celled, the placentæ projecting from a thick central columella.

1 ALLOTROPA T. & G. Bot. Wilkes 385.

Scapose red or whitish scaly-bracted herbs with numerous small flowers in a virgate spike. Calyx of 5 rounded sepals, marcescent under the capsule. Corolla none. Stamens 10: anthers didymous on long and slender filaments, extrorse in the bud, becoming introrsely pendulous; cells opening by a chink from the apparent apex to the middle. Style short; stigma peltate-capitate. Capsule globose, very many-seeded. Seeds minute, scobiform, the loose coat produced at both ends. A single known species.

A. virgata T. & G. l. c. Stems several from a deep-seated perennial rootstock, 6-12 inches high or more, deep red or yellowish, thick and densely scaly at base, more sparingly scaly above; lower scales ovate, acuminate, the upper lanceolate passing into the linear bracts of the virgate spike: flowered spike: pedicels erect or spreading, 2-bracteolate: calyx closely dentate, shorter than the filaments. On dry wooded ridges of the Cascade Mountains, Washington to California.

PTEROSPORA Nutt. Gen. i, 269.

Tall scapose scaly-bracted plants with red or yellowish flowers in a long raceme. Calyx deeply 5-parted, persistent. Corolla gamopetalous, globular-urceolate, with 5 short recurved lobes, persistent. Stamens 10, not exerted: filaments subulate-filiform: anthers ovate-didymous, introrse, erect or in the bud horizontal-flexed, attached near the base, there dorsally 2-awned, the

slender awns deflexed, the cells opening lengthwise. Style short stigma 5-lobed. Capsule depressed-globose, 5-lobed, the thin walls persistent after dehiscence, being attached by the partitions to the columella. Seeds very numerous, the nucleus ovoid, with a close thin coat, apiculate at both ends, the upper apiculation bearing a broad thin wing. A single known species.

P. Andromedea Nutt. l. c. Stems several from a shallow seated perennial root, 1-3 feet high or more, light brown or purplish, glandular and viscid-pubescent throughout, bearing numerous lanceolate or linear scales, and many flowers in a long raceme: pedicels slender, spreading, soon recurved, 3-10 lines long: sepals oblong, 1-2 lines long: corolla white, 5 lines long, viscid. Under Pines, California to Brit. Columbia and the eastern States.

3 SARCODES Torr. *Smithson. Contrib.* iii, 17, t.10.

Low fleshy plants with numerous scale-like bracts and many red flowers in a short terminal raceme. Sepals 5, erect, persistent. Corolla cylindraceous-campanulate, with 5 barely spreading lobes. Stamens 10, shorter than the corolla; anthers linear-oblong, erect attached above the base, the 2 cells confluent throughout, the whole apex opening by a large introrsely oblique terminal pore. Ovary low-conical, 5-lobed. Style columnar, rather long; stigma capitate, somewhat 5-lobed. Capsule depressed 5-lobed. Seeds very numerous, oval, the coat reticulated, closely fitted to the nucleus except a small conical protuberance at the apex. A single known species

S. sanguinea Torr. l. c. Whole plant bright red: stem stout, 6-10 inches high, thickly clothed with, when young, well imbricated, firm flesh scales; lower scales ovate; upper narrower and more scattered, and above passing into the linear bracts of the thick raceme which subtend the flowers, all ciliate; pedicels erect, the upper ones very short; sepals oblong 6-8 lines long, ciliate, a little shorter than the glabrous corolla. On the high mountains of southern Oregon, California and Nevada.

4 MONOTROPA L. Gen. n. 536, in part.

Low fleshy plants with many scattered scale-like bracts and solitary nodding white flower. Calyx of 2-4 irregular sepals, perhaps bracts, the lower ones rather distant from the flower, deciduous. Petals 5, rarely 6, erect, not saccate at base, tardily deciduous. Stamens twice as many as petals: filaments filiform subulate: anthers somewhat reniform, opening at first by two transverse chinks, at length 2-valved, the valves almost equal and equally spreading. Style short and thick: stigma funnel-form, with naked edge. Capsule ovoid, erect in fruit. Seeds small, very numerous, scrobiform, the nucleus minute in the loose-cellular elongated coat. A single species.

M. uniflora L. Sp. 387. Bright white and glabrous throughout; stem clustered, 6-12 inches high, rising from a thick and matted mass of fibrous rootlets, 1-flowered, scaly; scales broadly lanceolate, entire; petals 4-5, puberulent within, 6-10 lines long; filaments pubescent. In damp woods throughout North America. Japan and India.

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5 HYPOPITYS Adans. Fam. Pl. ii, 443.

Low fleshy scaly-bracted plants with red or yellow flowers in loose terminal raceme. Sepals 3-5, nearly equal, erect, deciduous. Petals 4-5, longer than the sepals, saccate at base, erect with spreading tips, deciduous. Stamens 6-10; filaments filiform-tubulate; anthers reniform, the cells completely confluent into one, which opens by very unequal valves, the larger broad and spreading, the other remaining erect and contracted. Style columnar: stigma funnelliform, glandular or hairy on the margin. Capsule ovoid, the columella thick and fleshy. Seeds very numerous, small, scobiform; the nucleus minute in the loose-cellular coat. Only the following species known.

H. lutea Dill. *Monotropa Hypopitys* L. Red yellowish or white stems 6-12 inches high: bracts ovate-lanceolate, entire or slightly erose, densely imbricated at the base, scattered above: flowers 3-20, in a loose drooping at length erect raceme, 5-7 lines long, the terminal one 5-merous, the others usually 3-4-merous. In forests, Brit. Columbia to California and the eastern States. Europe and Asia.

H. fimbriata. *Monotropa fimbriata* Gray. Stems 6-12 inches high, red or yellowish, somewhat hairy: upper scales and bracts obovate to cuculate, erose or laciniately fimbriate: lateral flowers often 3-petalous and androus: sepals spatulate, laciniate. In forests of the Cascade and Coast mountains of Oregon.

Tribe 2 Pleuricosporea. Gray Syn. Fl. ii, 18. Ovary 2-celled or spuriously 4-5-celled: the 4 or 5 placentæ parietal and 2-lamellate. Disk none or obscure. Anthers linear or oblong, erect, introrse, attached by the base to the long and slender filaments, opening longitudinally.

6 PLEURICOSPORA Gray Proc. Am. Acad vii, 369.

Low fleshy white or yellowish herbs with fimbriate scales and petals, and white flowers in a short terminal raceme. Calyx complete, of 4 or 5 scale-like sepals. Corolla of 4 or 5 plain petals resembling the sepals. Stamens twice as many as petals: filaments ligulate-filiform: anthers linear, apiculate, the cells opening from base to apex into two equal valves. Ovary strictly one-celled. Style columnar: stigma depressed-capitate, or somewhat funnelliform. Seeds ovate, with a smooth or polished coat.

P. fimbriolata Gray l. c. Stout and erect, 3-10 inches high, glabrous or nearly so, clothed with imbricated scales; lowest scales ovate, firm, entire; upper passing into the narrower and lanceolate scarious margined and lacinate fringed bracts of the dense and erect cylindraceous raceme: sepals and petals white, oblong or oblong-lanceolate fimbriate-lacinate, not exceeding the bracts. In the Cascade and Coast Mountains of Oregon and the Sierra Nevadas of California.

P. longipetala. Stem rather slender, 4-6 inches high: scales well imbricated, lanceolate, more or less acuminate, laciniately toothed: flowers white or yellowish, numerous, in a dense oblong raceme: sepals lanceolate, acute or acuminate, sparingly laciniate-toothed, about equalling the bracts:

petals narrowly spatulate, 6 lines long, much longer than the sepals, the obtuse apex lacinately fimbriolate. In dense forests of the Cascade Mountains near the hot springs in Clackamas Co. Oregon. Rare.

7 NEWBERRYA Torr. Ann. Lyc. N. Y. viii, 55.

Low fleshy erect plants with red or brownish flowers in a terminal cluster. Calyx incomplete, of two bract-like entire sepals. Corolla tubular-urceolate, 4- or 5-lobed, persistent. Stamens twice as many as lobes of the corolla; filaments filiform, long-haired above the middle; anthers oblong, the cells opening from apex to base into two unequal valves. Ovary ovate, contracted at the apex into a long style; stigma depressed-capitate, umbilicate. Placentæ 4, with broad divergent lamellæ which meet adjacent edges, ovuliferous both sides, giving the appearance of 4 exterior cells surrounding a central larger one.

N. congesta Torr. l. c. Whole plant brownish, glabrous, 4-8 inches high: scales crowded or loosely imbricated, obtuse, thinnish, with obscurely erose margins; the upper forming similar bracts of the densely crowded glomerule of flowers: lobes of the corolla ovate, one third the length of the cylindraceous or slightly urceolate tube: filaments equalling the slender style: anthers narrowly oblong, the line of dehiscence close to the connective. In the high mountains of Washington to California.

ORDER LVII ARMERACEÆ

Somewhat woody plants with alternate leaves and regular symmetrical 5-merous perfect flowers: chiefly of saline soils. Calyx costate at the sinuses, persistent. Corolla with claws to the nearly distinct petals, or these united into a tube, convolute or rarely imbricated in the bud. Stamens as many as divisions of the corolla and opposite to them: the filaments adnate only to their base, or completely hypogynous: anthers 2-celled, opening longitudinally. Disk none. Ovary free, one-celled with a solitary anatropous ovule pendulous on a slender funiculus which rises from the base of the cell. Styles 5, distinct or united. Fruit dry, utricular or achene-like, somewhat dehiscent by a lid, or by valves. Seed with a straight embryo, and with or without mealy albumen.

1 ARMERIA Willd. Enum. Hort. Berol 333.

Acaulescent perennials with narrow persistent leaves in close tufts and naked scapes with a reversed sheath under the compact head of red flowers which are surrounded and subtended by scarious bracts and bractlets. Calyx funnelform, regularly 10-costate at base, the limb scarious. Corolla of 5 nearly distinct long-clawed petals, each with a stamen attached to its base. Style 5, filiform, united only at the very base, stigmatose above along the inner side. Utricle at length bursting irregularly at the base.

A. vulgaris Willd l. c. Scapes 8-12 inches high: leaves narrowly linear, flat or flattish, 1-3 inches long: bracts very obtuse: calyx at base simply decurrent on the pedicel; the tube 10-nerved, hairy at least on the

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stronger nerves or angles; the lobes blunt or cuspidate. Along the coast, California to the Arctic regions and the Atlantic coast. Europe and Asia.

ORDER LVIII PRIMULACEÆ Vent. Tabl. ii, 285.

Herbs with simple leaves and symmetrical flowers. Calyx 4-8-lobed or 4-8-parted, free, or rarely adnate to the base of the ovary, imbricated in the bud, usually persistent. Corolla hypogynous, except in *Samolus* in which it coheres below with the base of the ovary, 4-8-lobed or 4-8-parted, rarely none. Stamens as many as the lobes of the corolla and opposite to them, inserted on the tube or base of the corolla, rarely perigynous: anthers introrse. Ovary one-celled, with a free central placenta. Fruit capsular. Seeds with small straight embryo and copious albumen.

TRIBE I. Ovary wholly free: ovules amphitropous or half-anatropous.

* Scapose or tufted: flowers chiefly 5-merous, umbellate or solitary: capsule dehiscent by valves, at least at the apex.

+ Stamens connivent in a cone around the pistil, monadelphous.

Dodecatheon Corolla 5-parted, its division reflexed: filaments shorter than the anthers.

+ + Corolla salverform or funnellform: stamens distinct, included, with short filaments and short and blunt anthers.

Primula Corolla with tube surpassing or at least equalling the calyx, and spreading, mostly obcordate or emarginate lobes: capsule many-seeded.

Douglasia Corolla with tube equalling or surpassing the calyx, and entire lobes: ovary 5-ovuled: capsule 1-3-seeded.

Androsace Corolla short, its tube shorter than the calyx: ovules and seeds numerous or few.

* * Leafy stemmed: corolla rotate or somewhat so and the divisions convolute or sometimes involute in the bud, wanting in *Glaux*.

+ Capsules mostly globose, dehiscent vertically by valves, or irregularly.

Trientalis Leaves clustered at the summit of a simple stem: flowers mostly 7-merous: corolla completely rotate, without a tube, deeply parted: filaments long and filiform, united at base into a ring.

Steironema Leaves opposite, without dots: flowers 5 merous on slender drooping peduncles: corolla rotate, with no proper tube, deeply parted; the divisions each wrapped around a stamen.

Naumburgia Stems leafy throughout, the herbage glandular-dotted: flowers 5-7-merous, on stout axillary peduncles: corolla without proper tube, the lobes not wrapped around the stamens.

Glaux Stems leafy throughout: flowers solitary in the axils of the opposite leaves, 5-merous; corolla none: stamens inserted on the base of the calyx.

+ + Capsule globose, the top falling off as a lid: seeds numerous.

9 *Anagallis* Corolla completely rotate, 5-parted.

10 *Centunculus* Corolla with a globular tube and 4-5-lobed limb, shorter than the calyx.

TRIBE II. Ovary connate at base with the base of the calyx.

11 *Samolus* Leaves alternate: flowers 5-merous: corolla nearly campanulate: capsule 5-valved at the apex.

Tribe 1 *Primulæ* Endl. Gen. 730. Ovary wholly free: ovules fixed by the middle amphitropous or half anatropous.

§ *Scapigerous* or *tufted*. Flowers chiefly 5-merous, umbellate or solitary: lobes of the corolla imbricated in bud. Capsule dehiscent by valves sometimes obscurely so.

* *Stamens connivent in a cone around the style, monadelphous*

1 DODECATHEON L. Gen. n, 200.

Low acaulescent perennial herbs with entire leaves and few or numerous flowers in an umbel terminating a naked scape. Calyx deeply 5-lobed, the lobes reflexed in flower, erect in fruit. Corolla 5-parted, with very short tube and dilated thickened throat, the long and narrow divisions reflexed. Stamens inserted on the throat of the corolla: filaments short and flat, monadelphous, but separable in age. Style filiform, exserted: stigma small. Placenta columnar, many-ovuled.

* Filaments distinct.

D. dentatum Hook. Fl. ii, 119. Glabrous throughout: leaves ovate the blade 2-4 inches long by 1-2 inches broad, irregularly dentate, usually abruptly contracted below to a margined petiole nearly as long as the blade: scapes 4-8 inches long, few-flowered: involucre bracts linear, acuminate: calyx lobes triangular, acuminate, a line or more long: lobes of the corolla white with two purple spots at the base of each, linear-oblong, obtuse, 4-6 lines long: filaments very short: anthers linear-lanceolate, 2-toothed at the apex, brownish-red: capsule but little longer than the calyx, early opening from the apex by valves: seeds flat. In wet places on the bluffs of the Columbia river, and in Idaho.

D. campestrum. Glabrous throughout: leaves oblong, obtuse or acute, 1-2 inches long, tapering below to a broad petiole: scapes 3-6 inches high, 1-3-flowered: involucre bracts lanceolate, acuminate, 1-3 lines long: pedicels 4-6 lines long: calyx-lobes lanceolate, acute, 2 lines long: lobes of the corolla narrowly oblong, abruptly narrowed near the apex, 6-7 lines long, a line or more broad, pink above, with blue centre and white base: filaments very short: anthers linear-oblong, obtuse, pink with dark purple base: capsule oblong, opening by persistent valves. In prairies on the Klickitat hills, Klickitat Co. Washington.

* * Filaments more or less joined together into a tube:

+ Capsule opening by an operculate tip.

D. viviparum Greene Eryth. iii, 38. "Rootstock stout, horizontal or ascending short, simple or with a few branches, bearing coarse white fibrous roots beneath, and rather large bulblets above: leaves 6-10 inches long, oblong-lanceolate, tapering to a winged petiole, acute or obtuse at apex, the whole margin coarsely and regularly but not deeply crenate

with a callous point only: scape: the stoutest: pubescent: flower base: capsule opening by valves: parting little below the

D. tetrandrum cence minutely 3-12 inches long: scapes stout, 6-8 bracts setaceous: stamens mostly 4-merous: corolla purplish 6-8 lines long: dark purple: capsule apex, then splitting a marginal wing

D. Jeffreyi Glabrous except base, erect, 5-10 inches high: umbels red-purple: stamens very distinctly hispid: valves from the v. Oregon and California.

D. alpinum throughout: leaves tapering below to a flowered: involucre calyx about as long as the blade: oblong abruptly brownish-yellow long, often apiculate: California.

D. conjugens fascicle of fleshy: whole plant including the distal: umbel few-flowered: deep purple, varying the connective: throughout all but Oregon and Montana.

D. Hendersonii inflorescence minute: long narrowed below: flowered: involucre acuminate, twice yellowish base: stamens obtuse, short-apiculate: opening by a flat operculum: minutely tubular, minutely tubular, into California.

+ + *D. pauciflorum*

with a callous point in each sinus, or the crenation reduced to the callous point only: scapes 10-20 inches high, stout, bearing a many-flowered umbel: the stoutish pedicels and deeply parted calyx somewhat glandular-pubescent: flowers deep purple throughout: stamens distinct to the very base: capsule ovate-oblong, coriaceous, circumscissile near the apex, afterwards parting into 10 valves whose tips are closely recurved. At and a little below the limit of trees on Mount Rainier Washington. "

D. tetrandrum Suksdorf, Greene l. c. 40. Glabrous, or the inflorescence minutely glandular: leaves spatulate to lanceolate or oblanceolate, 3-12 inches long by 1-2 inches broad, tapering below to a winged petiole: scapes stout, 6-20 inches high: umbel few to many-flowered: involucre bracts setaceous: pedicels 1-3 inches long, enlarging at the summit: flowers mostly 4-merous: calyx-lobes lanceolate, acuminate, 3 lines long: corolla purplish with a yellow ring near the base, its lobes lanceolate, acute, 6-8 lines long: staminal tube very short; anthers linear-oblong, obtuse, dark purple: capsule surpassing the calyx, circumscissile very near the apex, then splitting into 10 short recurving valves: seeds oblong, flat, with a marginal wing all around. In wet places in the Cascade Mountains.

D. Jeffreyi Moore in Van Houtte Fl. des Serres xvi, 99, t. 1662. Glabrous except the hirsute and glandular inflorescence: leaves oblanceolate, erect, 5-10 inches long, entire, acutish, mucronate: scapes 12-18 inches high: umbel many-flowered: segments of the corolla ample, deep red-purple: stamens dark purple, usually only 4; anthers emarginate: style very distinctly hispidulous: capsule not surpassing the calyx, opening by valves from the very apex. In wet places in the mountains of eastern Oregon and California.

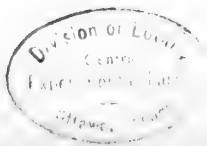
D. alpinum Greene l. c. *D. meadia* var. *alpina* Gray. Glabrous throughout: leaves oblong-lanceolate to spatulate, obtuse, 1-3 inches long, tapering below to a short petiole: scape 4-10 inches high 1 to several-flowered: involucre bracts lanceolate, acute, 1-2 lines long: lobes of the calyx about as long as the tube, narrowly lanceolate: corolla-lobes narrowly oblong abruptly contracted near the apex, 6-8 lines long, purple with brownish-yellow base: staminal tube very dark, a line long: anthers oblong, often apiculate. On wet banks and margin of lakes, Washington to California.

D. conjugens Greene Eryth. iii, 40. "Short crown with a dense fascicle of fleshy fibrous roots that are deciduous from it after the flowering: whole plant glabrous: leaves obovoid and elliptic, 2 to 5 inches long including the distinct petiole, obtuse, entire: scape stoutish 3 to 8 inches high: umbel few-flowered; flowers large, 4-merous, rarely 6-merous: corolla deep purple, varying to rose red and to white: anthers distinct, obtuse, the connective lanceolate, acuminate to a linear point, delicately rugulose throughout all but the linear tip: fruit unknown. Dry hills, southeastern Oregon and Montana.

D. Hendersoni Gray Bot. Gaz. xi, 233. Glabrous throughout or the inflorescence minutely glandular: leaves elliptical to obovate, 1 inch or more long narrowed below to a short petiole: scape 4-16 inches high, rather few-flowered: involucre bracts triangular, acuminate: calyx-lobes triangular, acuminate, twice as long as the short tube: corolla-lobes dark purple with yellowish base: staminal tube a line long, dark purple: anthers oblong, obtuse, short-apiculate: capsule ovoid, much longer than the calyx, opening by a flat operculum and splitting downward into 10 valves: seeds globular, minutely tuberculate. Common throughout the Willamette Valley and into California.

+ + Capsule dehiscing by valves from the apex.

D. pauciflorum Greene Pitt. ii, 72. Glabrous throughout: leaves



$\frac{1}{4}$ – $\frac{1}{2}$ as long as the scape: involucre bracts lanceolate: segments of the corolla rich lilac-purple the undivided part yellow, with a scalloped ring of deep purple midway between the base of the segments and the stamen tube: stamen-tube often nearly as long as the anthers, yellow: anthers purple: capsule crustaceous, 6 lines long, nearly cylindrical, acute, opening by 5 short teeth. At middle elevations, eastern Oregon to the Rocky Mountains and New Mexico.

D. Cusickii Greene l. c. More or less pubescent and glandular: leaves broadly to narrowly lanceolate, entire, or dentate toward the apex, usually obtuse, 1–2 inches long, narrowed below to a winged petiole: scapes 3–4 inches high, few-flowered: bracts of the involucre narrowly lanceolate, 1–2 lines long: lobes of the calyx lanceolate, acute, but little longer than the tube: corolla-lobes dark purple with yellow base and a dark purple line at the mouth of the tube: stamen tube less than a line long, almost black: anthers yellow with a black stripe through the centre: capsule ovoid, acute, scarcely surpassing the calyx, 5-valved from the apex. Dry hillsides, eastern Oregon and Brit. Columbia.

* * * *Corolla salverform or funnellform: stamens included, distinct with short filaments and short blunt anthers.*

2 PRIMULA L. Gen. n. 197.

Perennial scapose herbs with all radical leaves and large or small flowers umbellate or in involucre or bracted racemose whorls at the summit of a scape. Calyx tubular, funnellform or campanulate, persistent, often angled, 5-lobed, the lobes imbricated. Corolla funnellform or salverform, the tube longer than or at least equalling the calyx. Stamens 5, distinct, inserted on the tube or at the throat of the corolla. Style filiform: stigma capitate. Capsule 5-valved at the summit, many-seeded. Seeds peltate: the testa punctate.

P. Broadheadæ Jones Zoe iii, 306. "2 to 4 inches high; 1 to 4 flowers; scape 2 to 4 inches long; leaves 1 to 4 inches long, narrowly elliptical rounded at apex, glabrous, rather thick, smooth, entire, narrowed at base to a winged petiole an inch or less long; flowers purple, about 5 lines wide; lobes orbicular or nearly so, notched, with a very short claw 2 lines long; tube exceeding the calyx by 2 lines; funnellform above the calyx; calyx lobes $1\frac{1}{2}$ lines long and subulate lanceolate, barely acute, equalling the tube of the calyx; pod nearly spherical; pedicels of the lateral flowers about a line long, the terminal one 2 to 6 lines long; bracts oblong to ovate lanceolate, entire or toothed at apex, 1 to 6 lines long; base of plant covered with the dead sheaths of former leaves. Marshy places at Ketchum Idaho.

Var. minor Jones l. c. "Leaves an inch long or less, elliptical ob lanceolate and acute, thin: lobes of the corolla as large as the type, but obovate; lobes of the calyx longer than the tube; flowers 1 to 2 on the scape; bracts long; plant 2 inches high. Bayhorse Idaho.

P. Cusickiana Gray Syn. Fl. Supp. 399. Leaves oblong-spatulate or narrower, 2 inches long, entire, or rarely denticulate: scapes 2–6 inches high, 1–4-flowered: involucre of 2 or 3 conspicuous unequal bracts: calyx green with a whitish line down from the sinuses of the campanulate tube: its lobes from lanceolate to subulate, about the length of the tube and nearly equalling the tube of the corolla: lobes of the corolla retuse. On rocky hillsides, Union Co. Oregon.

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3 DOUGLASIA Lindl. in Brande. Journ. Sci. 1827.

Depressed and tufted little herbs with suffrutescent or at least persistent stems, imbricated or crowded leaves and solitary or somewhat umbellate small flowers. Calyx campanulate, 5-lobed, persistent. Corolla tube equalling or surpassing the calyx, somewhat inflated above; the throat more or less contracted and 5-ornate beneath the sinuses. Stamens included, distinct, with short filaments and blunt anthers. Ovary 5-ovuled: style filiform. Capsule turbinate, 1 or 2-seeded.

D. dentata Watson Proc. Am. Acad. xvii, 375. Canescent with a firm mostly dense pubescence: rather stout, branching: leaves rosulate at the nodes, oblong, obtusish, mostly with 1-3 blunt teeth on each side toward the summit, 4-6 lines long: peduncle an inch long, bearing a simple, few-flowered umbel; pedicels very unequal: calyx narrowed at base, 3 lines long in fruit: the acuminate lobes nearly as long as the tube: capsule oblong, slightly stipitate, equalling the calyx-tube. On high ridges, Yakima Co. Washington.

D. laevigata Gray Proc. Am. Acad. xvi, 105. Depressed caespitose: leaves glabrous or with a few minute and scurvy deciduous branched hairs, not at all ciliate, entire, or with 1 or 2 teeth toward the summit, oblong-lanceolate, obtuse, mainly in rosulate radical or simply proliferous clusters, 3 lines long: peduncles short, scurvy-pubescent, 1-5-flowered: bracts of the involucre oval or ovate, short: corolla bright red, its tube almost twice as long as the ovate lobes of the calyx. On bluffs along the Columbia river from Bridal Veil to near Hood River: blooming in early spring.

4 ANDROSACE Tourn. L. Gen. n. 196.

Small annual or perennial herbs with tufted leaves and small white or pink flowers. Calyx persistent, 5-lobed to 5-parted. Corolla salverform or funnelform; the tube short, not longer than the calyx; the limb 5-lobed, imbricated in bud. Stamens 5, included, distinct, with short filaments and short blunt anthers. Style mostly short: stigma capitate. Capsule short, 5-valved from the apex, few to many-seeded.

A. septentrionalis L. Sp. 203. Leaves all rosulate at the summit of a slender annual root, lanceolate or oblong-lanceolate, narrowed at base into a winged petiole, from irregularly denticulate to laciniate-toothed, 6-12 lines long: scapes usually numerous, 2-10 inches high, several to many-flowered: bracts of the small involucre subulate: pedicels filiform, 1-2 inches long: calyx-tube obpyramidal, white or reddish, with subulate acute green lobes mostly shorter than the tube and rather shorter than the obovate lobes of the corolla: capsule ovoid, shorter than the calyx: seeds ovate, flattish. In open places, Brit. Columbia to California and the Rocky Mountains. Europe and the Arctic sea coast.

A. filiformis Retz. Obs. ii, 10. ? Annual: leaves ovate, obtuse, narrowed at base to a winged petiole, entire, 2 lines long: scapes filiform, 1-2 inches high: bracts of the involucre minute, subulate: pedicels filiform, an inch long or less: calyx-tube hemispherical, green, with short angular lobes: tube of the corolla at length much longer than the calyx, the short ovate lobes closely reflexed: capsule ovoid, much longer than the calyx: seeds globular, minutely tuberculate. Edge of water near Forest Grove Oregon.

§ § *Leafy-stemmed. Leaves entire. Corolla rotate or somewhat so; the divisions convolute or sometimes involute in the bud, wanting in Glaux.*

* *Capsule mostly globose, dehiscent longitudinally by valves or irregularly.*

5 TRIENTALIS L. Gen. n. 461

Low and glabrous perennial herbs with a simple stem, simple leaves mostly clustered at the summit and white or pink flowers on filiform pedicels. Flowers 5-7-merous, usually 6-merous. Corolla completely rotate, without a tube, deeply parted, the divisions convolute in the bud. Filaments long and slender, united at base into a short ring; anthers linear, recurving when old. Style filiform. Capsule about 5-valved. Seeds few, rather large, covered with a white cellular-reticulated pellicle, remaining for some time fast on the placenta in a globular mass.

T. latifolia Hook. Fl. ii, 121. Stem slender, 2-6 inches high, from a small subterranean tuber; bracts subulate to lanceolate; leaves from lanceolate to ovate, usually abruptly acuminate, 1-3 inches long, narrowed below to a short petiole; pedicels filiform shorter than the leaves; calyx lobes linear-lanceolate, acute or acuminate; corolla-lobes lanceolate, acuminate one third longer than the calyx. Common in forests, California to Vancouver Island.

T. arctica Fischer in Hook. l. c. *T. Europæa* var. *arctica* Ledeb. Stem very slender, 1-4 inches high, with small scattered obovate leaves below; upper leaves obovate-lanceolate to lanceolate, 6-12 lines long; pedicels filiform, longer than the leaves; lobes of the calyx linear, very acute, 2-3 lines long; lobes of the corolla lanceolate, acuminate and tipped with a slender bristle, nearly twice as long as the calyx. In high mountain marshes and along the coast, Oregon to Alaska and Behring Straits.

6 STEIRONEMA Raf. Ann. Gen. Phys. vii, 192.

Leafy-stemmed perennial herbs with opposite or verticillate simple leaves and axillary yellow flowers nodding on slender pedicels. Flowers 5-merous. Corolla rotate with no proper tube, deeply 5-parted, the sinuses rounded; the divisions ovate, cuspidate-pointed, each separately involute or convolute around its stamen. Stamens 5, alternating with 5 sterile filaments; distinct or nearly so, inserted on a ring at the base of the corolla. Capsule 10-20-seeded.

S. ciliatum Raf. l. c. Glabrous throughout except the petioles; stem erect, 2-4 feet high, mostly simple; leaves ovate-lanceolate to oblong-ovate, gradually acuminate, 2-5 inches long, mostly with rounded or subcordate base, minutely ciliate, membranaceous, pinnately veined; their long petioles hirsutely ciliate; calyx-lobes linear-lanceolate, acuminate; lobes of the corolla obovate, obtuse, nearly twice as long as the calyx, erose-denticulate, 4-6 lines long; capsule longer than the calyx. Low grounds, Oregon to Brit. Columbia and across the Continent.

S. levigatum. Stems slender, 1-3 feet high, white and smooth, paniculately branched above; leaves lanceolate to linear-lanceolate, all petioles

ate, not at all ciliate, the lower ones acuminate, about as long as the calyx.

7

Erect perennial reduced to scales, calyx 5-7-divided, deeply 5-7-parted, stamens 5-7, alternating at base, alternate, each sinus of the stigma capitate.

N. thyrsiflora. Glabrous or bristly, leaves lanceolate, reduced to ovate at middle of the stem, al or numerous, calyx linear-lanceolate, lobes of the corolla linear-lanceolate, Oregon to Alaska.

Small leafy-stemmed axillary whorls, lobes petaloid, impanulate tubular, alternate with the stamens, attached at the top.

S. maritima L. 6-12 inches high, stem oval to oblong, the middle axillary whorls ovate, lobes oval, California to Alaska.

* * Glabrous, seeds numerous.

9

Low annual or small red, persistent. Corolla involute in the bud; filaments filiform.

S. arvensis L. much branched, alternate or in threes, 6 lines long; filaments

ate, not at all ciliate except a few hairs at the base of the clasping petiole, the lower ones often subcordate at base: lobes of the calyx lanceolate, acuminate, about 4 lines long: lobes of the corolla obovate, but little longer than the calyx. In marshes along the Rogue river near Grant's Pass Or.

7 NAUMBURGIA Mönch Meth. Supp. 32.

Erect perennial herbs with opposite entire leaves, the lower reduced to scales, and small yellow flowers in short axillary spikes. Calyx 5-7-divided, the sepals linear, slightly imbricated. Corolla deeply 5-7-parted, with very short tube and narrow segments. Stamens 5-7, exserted; filaments slender, glabrous, slightly united at base, alternating with as many small tooth-like staminoidea at each sinus of the corolla. Style slender, equalling the stamens: stigma capitate. Capsule 5-7-valved, few-seeded.

N. thyrsiflora Duby in DC. Prodr. viii, 60. *Lysimachia thyrsiflora* Glabrous or becoming so: stem 1-2 feet high, from a slender rootstock: leaves lanceolate, sessile, 1-2 inches long, the lower smaller and the lowest reduced to ovate scales: peduncles from only 2 or 3 pairs of leaves near the middle of the stem, axillary, shorter than the subtending leaf, bearing several or numerous small flowers in a dense head or oblong spike: lobes of the calyx linear-lanceolate, acute, half as long as the narrow purple-dotted lobes of the corolla: capsule globose, glandular dotted, few-seeded. In wet bogs, Oregon to Alaska and the eastern States. Europe, Asia and Japan.

8 GLAUX Tourn. L. Gen. n. 291.

Small leafy-stemmed herbs with opposite entire leaves and small axillary white or pink apetalous flowers. Calyx 5-parted, the lobes petaloid, imbricated in the bud, about as long as the impanulate tube. Stamens 5, inserted at the base of the calyx and alternate with its lobes: filaments subulate-filiform: anthers cordate, attached by their backs to the filaments. Capsule 5-valved at the top, few-seeded.

G. maritima L. Sp. 207. Glabrous and glaucous or pale: stems slender, 6-12 inches high from slender perennial rootstocks, very leafy: leaves ovate to oblong-linear, 3-6 lines long, entire, sessile: flowers usually in the middle axils only, solitary and very nearly sessile, white or pink: calyx-lobes oval, 1-2 lines long: seeds oblong, brown. In salt marshes, California to Alaska and across the Continent. Europe and Asia.

* * *Glabrous, capsule circumscissile; the top falling like a lid. Seeds numerous.*

9 ANAGALLIS Tourn. L. Gen. n. 206.

Low annual or perennial herbs with usually opposite leaves and small red, white or blue axillary flowers. Calyx 5-parted, persistent. Corolla completely rotate, 5-parted, the rounded lobes involute in the bud. Stamens 5, inserted on the base of the corolla: filaments bearded or pubescent: anthers broadly oblong-filiform. Capsule globose, many-seeded. Seeds minute.

A. ARVENSIS L. Sp. 148. Glabrous throughout: stems diffuse, usually much branched, 4-sided, 4-12 inches long from an annual root: leaves opposite or in threes or sometimes the upper ones alternate, ovate, sessile, 2 lines long: flowers scarlet, 2-3 lines broad, solitary, on long filiform

peduncles that recurve in fruit: lobes of the corolla lanceolate, acute, minutely denticulate or glandular-ciliate, but little longer than the calyx seeds minute. California to Oregon and the Atlantic States. Naturalized from Europe and Asia.

10 CENTUNCULUS Dill. L. Gen. n. 145.

Low glabrous annuals with mostly alternate leaves and minute solitary flowers in the axils of the middle leaves. Calyx 4-5-parted into linear acute lobes, longer than the corolla, persistent. Corolla small, with subglobose tube and 4 or 5 acute entire teeth. Stamens 4 or 5, inserted on the throat of the corolla, with distinct short filaments and broadly ovate to cordate obtuse anthers. Style filiform: stigma capitate. Seeds minute, numerous.

C. minimus L. Sp. 116. Stems ascending, 2-6 inches long, simple or branched: leaves ovate, obovate or spatulate-oblong, tapering at base, 2-3 lines long, all but the lowest sessile: flowers 4-5-merous: calyx-lobes lanceolate, acuminate, fully as long as the capsule. In moist places, California and Oregon to Brit. Columbia, Minnesota and Illinois. Europe and S. America.

Tribe 2 Samoleæ Endl. Gen. 734. Ovary connate at base with the base of the calyx.

11 SAMOLUS Tourn. L. Gen. n. 222.

Low glabrous caulescent herbs with alternate entire leaves and small white flowers in simple or paniced racemes. Flowers 5-merous. Calyx persistent, its tube adnate to the ovary below. Corolla perigynous, nearly campanulate; the rounded lobes imbricated in the bud. Fertile stamens 5, inserted on the tube of the corolla; with short filaments and cordate anthers: staminoidea 5 in the sinuses of the corolla, or wanting. Style short or slender: stigma obtuse or capitate. Capsule ovate or globular, 5-valved at the top, many seeded. Seeds minute.

S. floribundus H. B. K. Nov. Gen. ii, 224. Stems erect or ascending, 6-18 inches high, diffusely branched, leafy up to the racemes: leaves ovate to spatulate, 1-3 inches long, tapering to a short petiole: flowers usually numerous, less than a line broad, in loose paniculate racemes: pedicels filiform, spreading, 4-12 lines long, bracteolate near the middle: calyx adherent to the middle of the ovary and capsule, the lobes ovate half as long as the short-campanulate corolla: sterile filaments in the sinuses reflexed. In wet places, California to Brit. Columbia, Canada, Florida and Texas.

ORDER LIX OLEACEÆ Lindl. Nat. Syst.

Trees or shrubs, rarely almost herbaceous, with colorless bland juice, opposite, rarely alternate, leaves without stipules and perfect or diceious regular flowers. Flowers gamopetalous, 2-4-petalous, apetalous or even achlamydeous. Stamens 2, sometimes 4, fewer than the parts of the corolla, distinct. Ovary two-celled, with one or two pairs of anatropous ovules in each cell. Style one or none. Fruit a capsule, samara, berry or drupe. Seeds with a rather large embryo in firm fleshy

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albumen, or exalbumenous. Cotyledons flat, or plano-convex.

1 FRAXINUS Tour. L. Gen. n. 1160.

Trees with rather light tough wood, chiefly opposite and odd-pinnate leaves, and small flowers in panicles, appearing with or before the leaves from separate buds. Flowers diœcious or polygamous, sometimes perfect. Calyx very small, 4-cleft or irregularly toothed or entire or wanting. Petals, when present, 4, induplicate-valvate in the bud, either separate or united in pairs at the very base, often wanting. Stamens 2, sometimes 3 or 4. Ovary 2-celled, with a pair of ovules at the summit of each cell. Stigma 2-lobed. Fruit an entire dry indehiscent samara, with the wing mainly terminal, and suspended seeds.

F. Oregona Nutt. Sylv. iii, 59, t. 99. (OREGON ASH.) A tree 20-100 feet high and 1-4 feet in diameter: leaves and young branchlets villous-pubescent; leaflets 5-7, lanceolate-oblong to oval, usually acuminate, entire or nearly so, 2-4 inches long, leathery, the upper surface soon glabrous: flowers diœcious; all with a minute calyx and no petals; staminate panicles dense, with oblong anthers; pistillate in ample, at length rather loose panicles: fruit with nearly clavate and slightly compressed body, the margined edges gradually widened upward into the oblanceolate, wing, an inch or more long. By streams and swales, California to Brit. Columbia.

ORDER LX APOCYNACEÆ Lindl. Nat. Syst. ed. 2, 299.

Perennial herbs, shrubs or trees with mostly acrid milky juice, opposite, verticillate, or alternate entire leaves without stipules, and perfect regular 5-merous flowers. Calyx free, or hours adherent to the very base of the ovaries. Corolla convolute and often twisted in the bud. Stamens 5, borne on the corolla and alternate with its lobes: anthers 2-celled, disposed to cohere with the stigma: pollen-grains simple, often glutinous. Ovary of 2 distinct carpels with the styles or stigmas united, or 1-celled with 2 parietal placentæ, or 2-celled. Ovules few to numerous. anatropous or amphitropous. Seeds often bearing a coma. Embryo large, in sparing albumen.

1 APOCYNUM Tourn. L. Gen. n. 305

Perennial herbs with branching stems, opposite mucronate tipped leaves and small white or rose-colored flowers in terminal and axillary small cymes. Calyx 5-parted, its short tube coherent by the disk with the base of the ovaries. Corolla campanulate, 5-cleft, toward the base bearing a triangular scale-like appendage opposite each lobe. Stamens borne on the base of the corolla: filaments very short: anthers of firm texture, sagittate, conniving around the solid stigma, to a ring of which the broad summit of the connective adheres. Proper style none. Ovaries two, ovoid, in fruit becoming a pair of long slender follicles. Glands 5, around the base of the ovaries.

A. androsæmifolium L. Sp. 213, Stem erect with divergent branch-

es, 6-18 inches high, from deep-seated perennial roots: leaves ovate or roundish, 1-4 inches long, abruptly and setaceous callous-mucronate, conspicuously petioled; pale and more or less pubescent beneath: flowers very fragrant, in open cymes: pedicels 2-3 lines long, subulate-bracted at the base; corolla open-campanulate, about 4 lines broad, its tube much longer than the ovate acute lobes of the calyx, its short lobes recurved; mature follicles 3-5 inches long. In dry open woods, California to Alaska and the eastern States.

Var. *pumilum* Gray Syn. Fl. ii, 82. Low: leaves roundish. Brit. Columbia to California.

A. *cannabinum* L. Sp 213. Stems erect or ascending, 1-6 feet high, with ascending branches, glabrous, or sometimes soft-pubescent, leafy to the top: leaves from oval to oblong or even lanceolate, with rounded or subcordate base, short petioled or sessile 2-6 inches long: cymes erect, densely flowered: corolla greenish-white or slightly flesh-colored: its lobes almost erect, the tube not longer than the lanceolate calyx-lobes: follicles slender, 2-3 inches long. Moist meadows, California to Brit. Columbia and the eastern States.

ORDER LXI ASCLEPIADACEÆ Lindl. Nat. Syst. ed. 2, 302.

Mostly herbs with milky juice, usually opposite leaves without stipules, and regular perfect flowers in terminal or pseudo-axillary or sometimes axillary cymes; often umbelliform. Calyx free from the ovary or nearly so, imbricated in the bud. Corolla 5-merous, convolute, or often nearly valvate in the bud. Stamens 5, borne on the tube of the corolla and alternate with its lobes: anthers surrounding the stigma. Pollen in 1 or 2 waxy masses, in ours all the pollen in each cell in one mass and attached to the stigmatic disk by the glands that alternate with the anthers. A crown of 5 parts or lobes usually present between the corolla and the mostly monadelphous stamens, and adnate either to the one or the other. Ovary of 2 cells that become follicles, or by abortion, one several to many-seeded follicle. Seeds almost always bearing a long and soft coma. Embryo nearly as long as the seed, in mostly thin, cartilaginous albumen.

Flowers with a hooded appendage behind each anther.

- 1 **Asclepias** An incurved horn or projecting crest from the cavity of each hooded appendage.
- 2 **Gomphocarpus** Hooded appendages with 2 horns or crests.

1 ASCLEPIAS L. Gen. n. 306.

Herbs with erect or merely spreading stems from deep and thickened perennial roots, opposite or sometimes verticillate or alternate leaves and terminal and lateral umbellate inflorescence. Calyx 5-parted, commonly bearing some minute processes at the base within. Corolla rotate, 5-parted, dextrorsely valvate-convolute in the bud. Crown consisting of 5 distinct cucullate or hollowed nectariferous appendages, opposite the anthers, that are involute or complicate and bearing a horn or crest-like process from the back or toward the base within, either sessile or elevat-

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ed on a column which is shorter than the anthers. Anthers tipped with an inflexed or sometimes erect membrane; the polleniferous cells lower than the stigma. Pollen masses suspended, attached in pairs to the glands of the stigmatic ring.

A. speciosa Torr. Ann. Lyc. N. Y. ii, 218. Finely canescent-tomentose, rarely glabrous with age: stem stout, 2-8 feet high: leaves from subcordate-oval to oblong, thickish transversely veined, 3-8 inches long, short petioled: peduncles shorter than the leaves: calyx-lobes densely tomentose, lanceolate, 2 lines long, closely reflexed: lobes of the corolla oblong, more than twice as long as the calyx, reflexed: hoods 4-6 lines long, spreading, the dilated body and its short inflexed horn not surpassing the anthers, but the centre of its truncate summit abruptly produced into a lanceolate-angulate thrice longer termination: staminal column hardly any: wings of the anthers notched and obscurely corniculate at base: follicles echinate with soft spinose processes, densely tomentose, 2-4 inches long. Along streams, California to Washington, Nebraska and Arkansas.

A. cryptoceras Watson Bot. King 283 t. 28. Glabrous: stem decumbent, 6-10 inches long, simple: leaves 3-4 pairs, rounded-ovate, 1-2 inches long, on very short petioles: umbel solitary and terminal, sessile, few-flowered: corolla-lobes ovate-lanceolate, spreading, greenish-yellow, 5 lines long: hoods of the crown 3 lines long, equalling the disk, purple, ovate, abruptly pointed with 2 short recurved beaks; horns short, incurved, not at all exserted: follicles 1-2 inches long. Eastern Oregon to Utah and Nev.

A. Mexicana Cav. Ic. i, 42, t. 58. Glabrous: stems erect, 3-5 feet high: leaves in whorls of 2-6, sometimes also in axillary fascicles, petioled, linear or narrowly lanceolate, 3-6 inches long by 2-6 lines broad: umbels densely flowered: pedicels and flowers softly puberulent: calyx-lobes ovate-lanceolate, reflexed: corolla-lobes oblong, 2 lines long: hoods broadly ovate, entire, shorter than the anthers, exceeded by the stout subulate horn: follicles smooth, narrow, 2-3 inches long. Along streams, Washington to California, Arizona and Nevada.

2 GOMPHOCARPUS R. Br. in Mem. Wern. Soc. i, 37.

Our species herbs with erect stems, opposite leaves and numerous flowers in terminal and axillary umbels. Differing from *Asclepias* only in not having horns nor crests to the hoods. Calyx 5-parted, the divisions soon reflexed. Corolla rotate, 5-lobed, dextrorsely valvate-convolute in the bud, soon reflexed. Crown consisting of 5 distinct cucullate appendages, destitute of crest or horn and more or less elevated on a column. Body of the stigma 5-angled.

A. cordifolius Gray Bot. Cal. i, 477. Glabrous: stems rather stout, 2-3 feet high: leaves ovate or ovate-lanceolate, with cordate clasping base, 2-5 inches long: umbels loosely many-flowered: slender pedicels long and filiform, equalling or shorter than the peduncle: calyx villous-pubescent: corolla dark red-purple, the lobes oval or oblong, 3-4 lines long: hoods erect on the summit of the short column, purplish, thin, ventricose, with dorsally truncate summit, produced at the margins into subulate ascending cusps, equalling the anthers, a narrow fissure down the dorsal side: follicles ovate-lanceolate, smooth and glabrous, erect on the pedicel. On dry hillsides, southern Oregon and California.

OREER LXII GENTIANACEÆ Dumort. Anal. Fam. 20.

Smooth herbs with bitter colorless juice, opposite, rarely alternate or verticillate, leaves without stipules, and perfect regular flowers. Calyx mostly 4-12-lobed or -toothed, often marcescent. Corolla gamopetalous, 4-12-lobed or -toothed, convolute or imbricated and usually twisted in the bud, often marcescent. Stamens as many as lobes of the corolla, alternate with them, inserted on its tube; the 2-celled anthers opening longitudinally. Ovary free, one-celled, rarely 2-celled, with two parietal placentæ, or the whole parietes ovuliferous. Style single, with usually two-lobed or two-lamellate stigma. Capsule dehiscent through the placentæ. Seeds indefinitely numerous, rarely few, commonly small, anatropous, with a minute embryo in fleshy albumen.

SUBORDER I GENTIANEÆ Leaves always simple and entire. Lobes of the corolla never valvate in the bud.

* Style filiform, usually deciduous from the capsule.

1 **Microcala** Calyx 4-toothed and 4-angled: anthers cordate-ovate and unchanged in age.

2 **Erythræa** Calyx 5-parted, or sometimes 4-parted: anthers oblong or linear, twisting spirally in 1 or 2 turns in age.

* * Style short or subulate and persistent, or none.

+ Corolla without nectariferous pits or large glands.

3 **Gentiana** Corolla funnelform, campanulate or salverform: seeds very numerous and small.

+ + Corolla with 1 or 2 nectariferous pits or spots, or an adnate scale to each lobe.

4 **Swertia** Corolla rotate, usually 5-parted: capsule ovate: seeds comparatively large.

5 **Frasera** Corolla rotate, 4-parted: seeds comparatively few and large.

SUBORDER II MENYANTHEÆ Leaves often crenate or trifoliate, all alternate and petioled. Corolla induplicate-valvate in the bud.

6 **Menyanthes** Corolla somewhat funnelform or campanulate, 5-cleft.

Suborder 1, *Gentianeæ* DC. Prodr. ix 38. Leaves always simple and entire, sessile, never alternate except in *Swertia*. Corolla never valvate in the bud.

1 MICROCALA Link & Hoffm. Fl. Port. i, 359.

Little annuals with opposite entire sessile leaves and yellow flowers. Calyx 4-toothed and 4-angled. Corolla short-salverform bearing the 4 short stamens in its throat: anthers cordate-ovate, unchanged in age. Style filiform, deciduous: stigma as if compressed-capitate but of 2 fan-shaped lobes that are at first connivent, but at length separate. Seeds numerous, with close and foveolate coat.

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M. quadrangularis Griseb. DC. Prodr. ix, 63. Stem filiform, simple or branched, 2-3 inches high: leaves 2-3 pairs, oval or oblong, 2-3 lines long: flowers solitary at the summit of the stem or branches: calyx at first oblong-campanulate, in fruit broader, truncate at top and bottom, strongly 4-angled; the teeth short and subulate; corolla saffron-yellow, 3 lines long: capsule ovoid. In prairies, Umpqua Valley Oregon to Calif.

2 ERYTHRÆA Neck. Elem. ii, 10.

Low herbs with sessile entire leaves, and small or middle sized commonly numerous pink white or yellow flowers in cymes or spikes. Flowers 5-merous, sometimes 4-merous. Corolla salverform with either a short or rather long tube; the lobes often contorted and becoming narrower with age. Filaments slender. Anthers oblong or linear, commonly exerted, twisting spirally in one or two turns after opening. Style filiform: stigma 2-lobed, the lobes from oblong to fan-shaped. Ovary 1-celled: the placenta more or less intruded. Capsule from oblong-ovoid to fusiform, 2-valved.

E. Muhlenbergii Griseb. DC. Prodr. ix, 60. "A span or less high, at length fastigiate branched from the base, cymosely flowered at summit: leaves oblong, obtuse; the floral lanceolate: pedicels short or hardly any in the forks; the lateral often as long as the flower, but 2-bracteolate at summit: lobes of the rose-red corolla oval, very obtuse or retuse, in age merely oblong, 2 or almost 3 lines long, much shorter than the tube: anthers oblong: seeds short-oval." Western Oregon and California.

E. Douglasii Gray Bot. Cal. i, 480. Stem slender, 6-12 inches high, loosely and paniculately branched usually sparsely flowered: leaves from oblong to linear, mostly acute: flowers all on strict and slender peduncles or pedicels: lobes of the pink corolla oblong, obtuse, at most 3 lines long, mostly half the length of the tube: anthers oblong: stigma fan-shaped: seeds globular. In moist places, Oregon and California to Utah and Wyoming.

E. Nuttallii Watson Bot. King 276, t. 29. Stem erect, loosely branched, 3-12 inches high: leaves linear-oblong, 6-12 lines long, acute: panicle dichotomous, few-flowered: flowers on elongated slender peduncles: lobes of the pink corolla elliptic-oblong, 2-3 lines long, acute: stigma somewhat cup-shaped, slightly 2-lobed: capsule 4-7 lines long, becoming nearly twice the length of the calyx: seeds oblong. Nevada to Idaho and Utah.

E. minima. Stem filiform, simple or sparingly branched, 1-2 inches high: leaves lanceolate, acute, 1-3 lines long: flowers racemosely disposed, all pedicellate: lobes of the pink or white corolla lanceolate, acute, 2 lines long, more than half as long as the tube: anthers oblong: lobes of the style fan-shaped seeds globular, strongly pitted. In wet places, throughout western Oregon.

E. curvistamenea Wittrock. Stem slender 2-4 inches high, simple or sparingly branched: leaves oblong-lanceolate or the upper ones linear, acute: flowers on long slender pedicels: lobes of the light red corolla linear-lanceolate, 2 lines long, half as long as the tube: summit of the filaments curved downward with the anthers in a tangled mass about the stigma: seeds not seen. Lincoln County Washington.

3 GENTIANA Tourn. L. Gen. n. 322.

Erect herbs with chiefly sessile opposite leaves and conspicuous flowers that usually open only in sunshine. Calyx common-

ly with a membranous or spathaceous tube. Corolla funnelform or campanulate to salverform or rotate, without pits large glands or scales; the sinuses with or without pleats or appendages. Stamens as many as lobes of the corolla and inserted on its tube, included; anthers connate into a tube or separate, remaining straight after opening. Style very short or none; stigma of two spreading or rarely united lamellæ, persistent. Seeds very numerous, often covering the whole inner walls of the thin 2-valved capsule.

§ 1 *GENTIANELLA* Gray Syn. Fl. ii, 116. Corolla without extended pleats or lobes or teeth at the sinuses. Anthers usually versatile. Stigmas distinct or only causally united.

* Flowers large or middle sized, solitary on a naked peduncle terminating the stem or branches, not bracteate at base, mostly 4-merous: corolla campanulate-funnelform, its lobes usually fimbriate or erose, not crowned: a row of glands alternating with the base of the filaments.

G. serrata var. *holopetala* Gray Bot. Cal. i, 481. Slender, 2-16 inches high, with comparatively long peduncles: leaves linear or lanceolate-linear: calyx-lobes ovate-acuminate, acutely carinate, the 2 exterior longer and narrower than the others: corolla an inch or more long, its oblong lobes entire or merely erose-denticulate around the summit: capsule short-stipitate: seeds squamulose-roughened. In the high Sierra Nevada Mountains and northward to Oregon.

G. simplex Gray Pacif. R. Rep. v, 87, t. 16. Stem 2-10 inches high, simple, bearing 2-4 pairs of lanceolate or linear-oblong leaves 3-9 lines long, and a single blue flower on a slender peduncle: calyx-tube and lobes hardly at all angled or carinate; the lobes nearly equal and similar: corolla an inch long, its oblong-spatulate lobes entire or erose-dentate, and sometimes a fringe of a few bristly teeth low down on the sides: capsule raised on a short stipe: seeds smooth but longitudinally striate, narrow, wingless when mature except a cellular appendage at both ends. Higher parts of the Cascade and Sierra Nevada mountains.

* * Flowers small, 4-5-merous: corolla somewhat funnelform or salverform when expanded, the lobes entire.

G. tenella Roth. Act. Hafn. x, 436, t. 2, fig. 6. "An inch to a span high: leaves (2 to 6 lines long) oblong or the lowest spatulate: calyx deeply 5- (sometimes 4-) parted; the lobes foliaceous, oblong to ovate, usually unequal: corolla $2\frac{1}{2}$ to 4 lines long, double the length of the calyx (more lengthened in fruit), blue; its lobes ovate-oblong, rather obtuse, little shorter than the tube: fimbriate crown conspicuous at the throat." High mountain summits, Idaho to the Rocky Mountains.

G. acuta Michx. Fl. i, 177. *G. Amarella* var. *acuta* Herder. Stem leafy, slightly wing-angled, simple or branched, 6-20 inches high: lower leaves obovate to spatulate, obtuse, the upper lanceolate, acute or acuminate at the apex, rounded or subcordate at base, sessile or somewhat clasping, 6-24 lines long: flowers numerous, racemose-spicate, 5-8 lines high: pedicels 2-6 lines long, leafy-bracted at base: calyx usually almost 5-parted, its lobes lanceolate or linear, equal or one or two of them longer: corolla longer than the calyx, usually blue, its lobes oblong, acute or becoming obtuse: crown in the throat of few setae: capsule sessile. In the high mountains California to Alaska and across the Continent.

G. striata high, with str lanceolate-line the lobes unec the calyx: cr Idaho, Wyom

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G. Newberr inches long, an these obovate o smaller, connate calyx-lobes lanc late tube: coro white within, g appendages 2-cl broadly winged. from Mariposa C

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G. bisetæa rather thick, ov the apex; narro uppermost pair 4-5 lines long by lobes of the blu late tube; apper capsules stipitat widest on one near Waldo, Ore

G. calycosa ovate, 6-15 line the lowest pairs so; the uppermo commonly folita cordate, about a its appendages i

G. striata. *G. Amarilla* var. *striata* Watson. Stem strict, 1-4 feet high, with strict branches, remotely leafy: leaves thickish, the cauline lanceolate-linear: flowers numerous, usually 4-merous: calyx deeply cleft, the lobes unequal: corolla whitish, 3-5 lines long, but little longer than the calyx: crown in the throat of few setae or wanting. Mountains of Idaho, Wyoming and Nevada.

§ 2 PNEUMONANTHA Neck. El. ii, 12. Flowers almost always 5-merous. Corolla plicate at the sinuses, the pleats more or less extended into thin-membranaceous teeth or lobes: without crown or glands. Stigmas distinct. Capsule more or less stipitate.

* Perennial by offsets or propagula: leaves marginless: flowers cymose: calyx short, 5-cleft: anthers oblong-linear, introrse, remaining erect.

G. Douglasiana Bong. Veg. Sitka, 38, t. 6. Stem 2-10 inches high, cymosely branched: leaves ovate, the lowest rosulate, the cauline of few remote pairs and somewhat cordate, 2-4 lines long: corolla yellow, 4-5 lines long, its lobes oblong, shorter than the funnelliform tube, not twice as long as the conspicuous and equally broad 2-cleft lobes in the sinuses: capsule stipitate, obovate, two-edged above: seeds elongated-oblong, a line long, apiculate at both ends; coat close. In wet places, Oregon to Alaska.

* * Root perennial: flowers comparatively large, mostly short-peduncled or sessile, usually two-bracteate below: anthers linear, or oblong, unconnected, seldom connivent, more or less extrorse, remaining erect.

+ Dwarf; 1-5-flowered: cauline leaves only 2-4 pairs.

G. Newberryi Gray Proc. Am. Acad. xi, 84. "Stems 1-flowered, 2-4 inches long, and ascending from the axils of the rosulate-radical leaves: these obovate or spatulate, an inch or more long; cauline leaves much smaller, connate-sheathing: the lowest obovate, the uppermost lanceolate: calyx-lobes lanceolate or oblong, nearly the length of the oblong-campanulate tube: corolla broadly funnelliform, inch and a half long, pale blue, white within, greenish dotted; its lobes ovate, mucronate; the interposed appendages 2-cleft or lacinate, subulate-tipped: seeds round-oval, smooth, broadly winged. Sierra Nevada, California, in or near the alpine region, from Mariposa Co. north to S. Oregon.

+ + Low: stems several from the same caudex: cauline leaves 6-16 pairs, more or less connate or even sheathing at base, the uppermost involucrate around the sessile terminal flower or 3-5-flowered cluster.

G. bisetæ. Stems decumbent or ascending, 8-16 inches long: leaves rather thick, oval to oblong, or the uppermost lanceolate, all rounded at the apex; narrowed and connate-sheathing below, about an inch long, the uppermost pair close to the solitary flower: calyx-lobes lanceolate, acute, 4-5 lines long by a line broad, about as long as the tube, strongly nerved: lobes of the blue corolla oblong, acute, not half as long as the campanulate tube; appendages in the sinuses two setae from a rather broad base: capsules stipitate: seeds oblong, with a broad wing all around, usually widest on one side. In marshes, eastern base of the Coast Mountains near Waldo, Oregon.

G. calycosa Griseb. Gent. 251. Stems erect, 6-12 inches high, leaves ovate, 6-15 lines long, commonly equalling or exceeding the internodes, the lowest pairs smaller and with connate-sheathing base, the upper hardly so; the uppermost involucrate and somewhat exceeding the calyx of the commonly solitary flower: lobes of the calyx ovate or oblong, or even subcordate, about as long as the turbinate tube: corolla oblong-funnelform, its appendages in the sinuses triangular-subulate, lacinate or 2-cleft at

tip, shorter than the broadly ovate lobes: seeds lanceolate, acuminate, wingless. On the highest mountains, Washington to California and the Rocky Mountains.

G. Parryi Engelm. Trans. Acad. St. Louis ii, 218, t. 10. Stems numerous from the crown of a somewhat woody root, 10-15 inches high: leaves glaucescent, thickish, ovate, varying to oblong-lanceolate, 9-18 lines long, most of the pairs with somewhat sheathing base; the upper 2 or 3 pairs involucrate around the 1-5 flowers, concealing the calyx and sometimes almost equalling the bright blue corolla: lobes of the calyx small, moderately or much shorter than the campanulate tube: appendages in the sinuses of the corolla narrow, deeply 2-cleft, but little shorter than the obovate lobes: seeds lanceolate, wingless, with obtuse or acutish edge. Alpine and subalpine in the Cascade and Rocky Mountains.

G. Gormanii. Stems erect, 10-18 inches high: lowest leaves small, with connate-sheathing base; the middle ones broadly ovate to nearly orbicular, with very short sheathing base, about an inch long, shorter than the internodes, the uppermost one or two pairs cordate or subcordate and involucrate around the usually solitary flower: calyx-lobes only 2, broadly ovate, acute or acuminate, longer than the tube: corolla bright blue, an inch long, nearly campanulate, its broadly ovate lobes short-acuminate: appendages in the sinuses very short, nearly entire: seeds oblong or lanceolate, apiculate. Moist subalpine meadows, northeastern Washington to Alaska.

* * * Stems either tall or low, many-leaved flowers not involucrate: style manifest.

Corolla oblong-campanulate, with broadly, ovate lobes more or less narrowed at base and the intervening plaits entire: calyx lobes usually from ovate to lanceolate, equalling or longer than the tube.

G. Menziesii Griseb. Gent. 191. "Stems a foot or less high slender: leaves from narrowly oblong to lanceolate (inch and a half or less long), somewhat 3-nerved: flowers one or two, short-peduncled or sessile: calyx according to Grisebach spathaceous and the lobes obsolete, in our specimens with oblong-lanceolate foliaceous lobes (5 lines long) equalling the turbinate-oblong tube: corolla an inch long; its lobes 3 lines long and wide; its plaits truncate and obscurely 3-crenate: seeds ovate-lanceolate or oblong, barely acute or both ends obtuse.—Bogs, W. Oregon to Mendocino Co., California."

G. sceptrum Griseb l. c. Stems erect, 2-4 feet high, simple, or short branched above, few to several-flowered: leaves ovate to oblong-lanceolate indistinctly 3-7-nerved: calyx-lobes unequal, lanceolate to ovate-oblong: corolla 1-2 inches long, its lobes nearly 4 lines long and wide, its plaits truncate or with barely rounded entire summit: seeds narrowly lanceolate with scarious acumination. Western Oregon to British Columbia.

G. Orfordii. Stems slender, 1-2 feet high, several from a thick perennial root: leaves linear-lanceolate, 3 nerved, 1-3 inches long, below reduced to connate-sheathing bracts: flowers on rather stout peduncles: calyx-lobes linear-lanceolate, acuminate 5-6 lines long, longer than the tube: corolla blue finely speckled within, an inch or more long, its short lobes acutish; appendages in the sinuses rounded: seeds minute cylindrical, not appendaged. Port Orford, Oregon, Oct. 1892 *Joseph Howell*.

* * * Corolla funnelliform, with ovate lobes not narrowed at base: the plaits extended into conspicuous laciniate-toothed or cleft appendages: margins of the leaves scabrous: seeds surrounded by a distinct and rather broad wing: ovate or oblong.

G. Oregana E. ... sometimes ... lanceolate ... several and racem ... long to ovate-l ... er an inch long ... d Idaho.

G. affinis Gris ... pend: leaves ... merous and th ... yx linear or sub ... tube, the short ... rowly funnell ... reading. Brit.

G. anisosepal ... 10 inches high, ... ves in a few pai ... ost cordate-oval, ... wers about 4 lin ... ptical very acut ... g the tube of th ... e corolla; coroll ... be, rather obtus ... ces Co. Idaho,

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G. obtusa Ledeb ... of L. "A span ... tulate (2 to 4 in ... and narrower, ... m or narrowly ... rowly lanceola ... oming lanceola ... crested with a ... Rocky Mounta

Smooth herbs ... numerous f ... ate, 4-parted, ... a single or ... wn at base.

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G. Oregona Engelm. in herb. Stems erect and rather stout, 1-2 feet high: sometimes more slender and ascending: leaves ovate, to ovate-oblong or lanceolate 1-2 inches long: flowers few at the summit or sometimes several and racemose-scattered: bracts oblong or ovate: calyx lobes from long to ovate-lanceolate as long as the tube: corolla broadly funneliform or an inch long, its short lobes roundish. Brit. Columbia to California and Idaho.

G. affinis Griseb. Gent. 191. Stems clustered, 8-12 inches long, mostly ascending: leaves from oblong to lanceolate or linear: flowers from few to numerous and thyrsoid-racemose: bracts lanceolate or linear: lobes of the calyx linear or subulate, unequal and variable, the longest rarely equalling the tube, the shorter sometimes minute: corolla an inch or less long, rather narrowly funneliform, its lobes ovate, acutish or mucronulate-pointed, spreading. Brit. Columbia to California and the Rocky Mountains.

G. anisosepala Greene Pitt. iii, 309. "Annual, erect, slender, simple, 10 inches high, with a few small flowers terminal and in the upper axils: leaves in a few pairs, the lowest obovate, the middle pairs oval, the uppermost cordate-oval, all obtuse, sessile, $\frac{1}{2}$ to more than $\frac{3}{4}$ inch long: the few lower about 4 lines long; calyx parted almost to the base into 5 narrowly apical very acute segments of unequal length, the shortest hardly equaling the tube of the corolla, the longest almost equalling the full length of the corolla; corolla broadly funneliform, the segments shorter than the tube, rather obtuse, almost equalled by the longer setae of the crown. Nez Percés Co. Idaho, Heller, July 1896 (n. 3440)."

— — Calyx 4-5-parted. Corolla with one or two nectariferous pits, or spots or an adnate scale to each lobe. Seeds comparatively large.

4 SWERTIA L. Gen. n. 321.

Simple-stemmed perennial herbs with mostly opposite petioled leaves and blue or white flowers in summer. Corolla rotate, 5-parted; the lobes dextrorsely convolute in the bud. Style none or very short: stigma 2-lamellate or 2-lobed. Capsule ovate: the persistent acetabulum not intruded.

G. obtusa Ledeb. Mem. Acad. St. Petersburg. v, 528. *S. perennis* Pall. of L. "A span to a foot or more high: lowest leaves oblong or obovate-lanceolate (2 to 4 inches long), tapering into a long petiole; upper cauline leaves narrower, sessile; some commonly alternate: inflorescence racemose or narrowly paniculate, few-many-flowered: flowers 5-merous: sepals narrowly lanceolate: lobes of the corolla (4-6 lines long) oblong-ovate coming lanceolate, the base bearing a pair of nectariferous pits which are crossed with a fringe. Subalpine in the Blue Mountains of Oregon to the Rocky Mountains, Alaska and Siberia.

5 FRASERA Walt. Fl. Carol. 87.

Smooth herbs with erect stems, opposite or verticillate leaves and numerous flowers in thyrsoid or paniculate cymes. Corolla rotate, 4-parted, the lobes dextrorsely convolute in the bud, bearing a single or double fringed gland, and sometimes a fimbriate awn at base. Stamens inserted on the very base of the corolla: filaments subulate, often united at base, occasionally with some exposed small bristles or scales. Ovary ovate, tapering into a distinct and often slender persistent style: stigma small, 2-lobed

or nearly entire. Capsule coriaceous, commonly flattened: the placentae or edges of the valves not intruded. Seeds comparatively few, compressed, commonly smooth and margined.

* Leaves marginless: sepals narrow, almost as long as the corolla: corolla with a single round gland upon each lobe; no crown at base: capsule strongly flattened parallel with the valves: seeds orbicular, wing margined: stem large and stout.

F. thyrsiflora Hook. Kew Jour. Bot. iii, 288. "Stems 2 or 3 feet high: leaves in pairs or threes, oblong or spatulate-obovate, the cauline 3 or 4 inches long: flowers in a dense interrupted thyrsus: sepals subulate-linear (4 lines long): lobes of the pale blue corolla ovate-oblong, thin, bearing the gland near the base: style short and conical, in some flowers hardly any. Idaho and interior of Oregon on the tributaries of the Columbia."

** Leaves not margined: sepals linear, equalling the corolla: a pair of oblong glands on each corolla-lobe and a separate crown below them: capsule compressed contrary to the almost conduplicate valves: seeds oblong, flat margined.

F. speciosa Dougl. Griseb. Gent. 329. Stem stout, 2-5 feet high, very leafy: leaves in fours and sixes, nervose; the radical and lowest cauline obovate or oblong, 6-10 inches long, the upper lanceolate and at length linear: flowers very numerous in a long leafy thyrsus: the peduncles and slender pedicels at length strict: lobes of the greenish-white or barely bluish and dark-dotted corolla oblong, acutish, half inch long, bearing a pair of contiguous and densely long-fringed glands about the middle, and a distant transversely inserted and setaceous multifid scale-like crown near the base, usually some minute setae between the bases of the filaments: style subulate, shorter than the ovary. In the mountains, east of Oregon to California, Wyoming and New Mexico.

*** Leaves with cartilaginous white margins, thickish, lanceolate or linear and grass-like, merely opposite, the cauline only 3-5 pairs: inflorescence a virgate interrupted thyrsus of 3-7 pairs of sessile or short-peduncled dense cymes, forming a series of glomerate clusters: pedicels very short: sepals subulate-lanceolate, about equalling the oblong or ovate lobes of the blue corolla: fringed glands solitary, elongated, extending from the base of the lobe to near the middle, saccate and with a longer and coarser fringe at base: crown staminal, consisting of a conspicuously laciniately parted or nearly entire scale between the filaments: style slender, twice the length of the ovary: capsule compressed parallel with the flat or flattish valves, few-seeded: seeds as far as known flat, smooth, acute-angled.

F. nitida Benth. Pl. Hartw. 322. Completely glabrous: stems slender, 1-2 feet high, simple: leaves linear-lanceolate; the radical ones 6-8 inches long; those subtending the upper flower clusters reduced to small bracts: sepals linear-lanceolate, acuminate, scarcely margined with white, entire: corolla blue, sometimes spotted with greenish dots, the lobes barely acute, bearing an elongated-oblong obtuse gland: thin scales between the filaments ovate or oblong-linear, entire or sparingly laciniate, longer than the ovary. Common from Brit. Columbia to California, east of the Cascade Mountains.

F. cusickii Gray Proc. Am. Acad. xxii, 310. Glabrous: stems slender, 2-3 inches high, but little longer than the radical leaves: thyrsus either of simple glomerules or interrupted spiciform: corolla large; its lobes nearly half-inch long, oval, obtuse: scales between the filaments large, orbicular, concave, nearly entire, surpassing the ovary. Hillsides of

Grande Ronde V

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Phlox Stam

grande Ronde Valley, eastern Oregon.

F. albicaulis Dougl. Griseb. l. c. Very minutely pruinose-puberulent: stems 10-18 inches high: radical leaves linear-spatulate, 2-4 inches long, attenuate below to a petiole: lobes of the corolla subulate, long acuminate, white margined, entire: lobes of the corolla lanceolate, acuminate: glands near, closed below into a kind of pocket: scales between the filaments long, laciniately cleft at the summit. Eastern Oregon and Washington Idaho.

Suborder 2. Menyanthes Griseb. *Gent.* 336. Marsh or aquatic perennials with heterogonous flowers. Leaves all alternate and mostly petioled. Corolla induplicate-valvate in the bud. Seed-coat crustaceous.

6 MENYANTHES Tourn. L. Gen. n. 202.

Perennial herbs with chiefly radical leaves, and white flowers on erect scapes or scape-like peduncles. Calyx 5-parted. Corolla somewhat funnelform or campanulate. 5-cleft, the lobes widely spreading, fimbriate or crested on the inner face. Stamens inserted on the tube of the corolla; filaments filiform; anthers gittate, versatile. Ovary one-celled; style long and slender; stigma bilamellate. Capsule oval, indehiscent, but bursting regularly across the top. Seeds rather few and large, orbicular and compressed; the close crustaceous coat smooth.

M. trifoliata L. Sp. 145. Scapes and leaves stout, 6-10 inches long, from a thick underground scaly stem or rootstock: leaves trifoliate; long-petioled; leaflets oblong or obovate, entire or repand, obtuse at the apex, narrowed to a sessile base, pinnately veined, 1-3 inches long: raceme borne on a long scape-like naked peduncle, 10-20-flowered: pedicels stout, 3-12 lines long, bracteolate at the base: flowers 5-7 lines long: corolla white or tinged with rose, the tube longer than the calyx, the upper surface of the lobes copiously fimbriate-bearded: capsule ovoid, obtuse, about 4 lines long. Bogas, Alaska to California and across the Continent.

ORDER LXIII POLEMONIACEÆ DC. Fl. Franc. iii, 645.

Herbaceous or rarely shrubby plants with bland colorless juice, simple or divided leaves without stipules and perfect regular flowers with a free ovary and hypogynous disk. Calyx 5-parted or 5-lobed, imbricated in the bud, persistent. Corolla 5-lobed, dextrorsely convolute and not plicate in the bud. Stamens 5, distinct, inserted on the tube of the corolla, alternate with its lobes. Style one, 3-lobed, or 3-cleft and stigmatic down the inner face. Fruit a 3-celled loculicidal capsule, usually with a thick placental axis; and few or many small amphipous or nearly anatropous seeds with a thin or soft coat, commonly developing mucilage when wetted. Embryo straight and rather large, in the axis of a fleshy or harder albumen. Cotyledons flat or flattish and rather broad.

* Leaves opposite and entire: seeds not mucilaginous when wet.

Phlox Stamens unequally inserted and included in the narrow tube

of the salverform corolla.

* * Leaves palmately 3-7-parted, the divisions rigid and pungent; seeds not mucilaginous when wet.

- 2 *Cantua* Woody-stemmed, at least at base: flowers solitary and sessile or few in a cluster at the summit of short branches or branchlets.

* * * Leaves mostly alternate and entire: seeds mucilaginous and throwing out spiral threads when wet.

- 3 *Collomia* Stamens unequally inserted in or below the throat of the funnelliform or salverform corolla: filaments slender, often exserted.

* * * Leaves various: seeds almost always mucilaginous when wet.

+ Leaves either opposite or palmately divided to the sessile base: usually both: seed-coat mucilaginous when wetted but destitute of spiral threads.

- 4 *Linanthus* Low glabrous annuals with opposite leaves.

+ + Leaves alternate and pinnately incised cleft or divided, rarely entire: seed coat mucilaginous and sending out spiral threads when wet.

- 5 *Navarretia* Low and much branched annuals, not floccose-woolly, mostly glandular and viscid: flowers capitate-crowded and dense: foliaceous-bracted: lobes of the calyx rigid and acrose-pungent: spinulose: corolla tubular-funnelform.

- 6 *Hugelia* Floccose-woolly annuals, neither glandular nor viscid: flowers capitate-glomerate and foliaceous-bracted; lobes of the calyx acrose or subulate and cuspidate or pungent.

- 7 *Ipomopsis* Biennials: not woolly: flowers thyrsoid paniculate: lobes of the calyx subulate: corolla narrowly tubular-funnelform.

- 8 *Gilia* Flowers scattered, crowded, or capitate-glomerate: corolla funnelliform to nearly rotate.

- 9 *Polemonium* Mostly smooth perennials with pinnate leaves: thyrsiform or cymulose-paniculate inflorescence: lobes of the corolla foliaceous, enlarging in fruit.

PHLOX L. Gen. n. 214.

Herbs or suffrutescent plants with opposite entire leaves, and showy red, white or blue flowers in terminal cymes or cymose panicles. Calyx tubular or tubular-campanulate, 5-cleft and 5-ribbed, the lobes acute or acuminate, mostly scarious-margined and the sinuses commonly scarious, not enlarging in fruit, often bursting when the seeds mature. Corolla strictly salverform, with slender tube and narrow orifice, the limb 5-lobed. Stamens 5, straight, inserted irregularly on the tube of the corolla: filaments very short; anthers not exserted. Ovary oblong-ovoid, 3-celled; with 1-4 ovules in each cell. Capsule obovoid, 3-valved. Seeds not mucilaginous nor emitting spiral threads when wet. Ours all belong to a peculiar section that is

Suffruticulose or suffrutescent, rarely herbaceous to the ground, chiefly with narrow or minute and thick-margined leaves, and one-flowered branchlets or peduncles.

* Densely evergreen, many-seeded or short.

+ Leaves alternate with corolla 2-3 inches high.

P. Hoodii

Alternate, becoming loosely imbricate, ovate, entire, 2-3 inches high, perhaps Idaho to

+ + Leaves with hairs, the margins either densely

P. caespitosa

tufted, 2-4 inches high, much crowded, the leaves rigidly lobed, the tips rigidly lobed, the lobes entire, lobes of the corolla and the lobes of the corolla

P. Douglasii

erect, 2-8 inches high, pubescent to nearly imbricate, sometimes short-peduncled, as the tube; corolla 1-4 lines long. Nebraska.

Var. andicola

lines long, less than

P. diffusa Bo

Depressed and divaricate, leaves linear or aciculate with woolly base with woolly broad-subulate lobes, white to white; with renulate obovate lobes to Alaska.

* * Loosely

base, or wholly spreading leaves, slender-peduncled

+ Calyx-tub

membranaceous, the narrowly-subulate corolla: style long

P. linearifol

times minutely lobed, 6-10 inches high, more than a line wide, strong replication of the acrose: tube of the

* Densely caespitose and depressed, mostly forming cushion-like evergreen mats or tufts: the short leaves crowded up to the solitary and sessile or short-peduncled flower: ovules solitary in each cell.

+ Leaves subulate or acerose, somewhat rigid, more or less beset or ciliate with cobweb-like or woolly hairs: plants forming broad mats 2-4 inches high.

P. Hoodii Richards. Frankl. Journ. Appx. t. 28. Sparsely or loosely caespitose, becoming glabrate: leaves subulate, rather rigid, erect, somewhat loosely imbricated: tube of the corolla not exceeding the calyx; its lobes obovate, entire, 2-3 lines long. Sandy plains and hillsides, Wyoming and perhaps Idaho to Nebraska and the Saskatchewan.

+ + Leaves rigid, 4-6 lines long, destitute of woolly or cobwebby hairs, the margins naked, or ciliate with rigid or rather soft hairs: plants either densely or loosely tufted.

P. caespitosa Nutt. Journ. Acad. Philad. vii, 41, t. 6, fig. 1. Stem tufted, 2-4 inches high: leaves linear-subulate or oblong-linear, commonly much crowded, hispid-ciliate, otherwise glabrous or with some short glandular-tipped rigid hairs: corolla with tube somewhat longer than the calyx; its lobes obovate entire lobes 3 lines long. On the highest mountains, Oregon to California and the Rocky Mountains.

P. Douglasii Hook. Fl. ii, 73, t. 158. Stems rather slender, ascending or erect, 2-3 inches long, rather loosely tufted: leaves acerose to linear-subulate, pubescent to nearly glabrous, often ciliate near the base, 3-6 lines long, loosely imbricated, sometimes spreading, usually fasciated at the nodes: flowers sessile or short-peduncled, 6-8 lines long: calyx pubescent; its subulate lobes as long as the tube; corolla with tube longer than the calyx, and obovate entire lobes 4-4 lines long. Eastern Oregon and Washington to Brit. Columbia and Nebraska.

Var. andicola Britton Mem. Torr. Club, v, 269. Leaves longer, 8-12 lines long, less fasciated at the nodes. Range of the type.

P. diffusa Benth. Pl. Hartw. 325. *P. Douglasii* var. *diffusa* Gray. Depressed and diffusely branched, forming mats 6-18 inches in diameter: leaves linear or acerose, 6-12 lines long, very acute sometimes ciliate near the base with woolly hairs: flowers usually sessile: calyx loosely tomentose, the broad-subulate lobes longer than the campanulate tube: corolla pink or purple to white; with a broad tube longer than the calyx, and entire or obscurely reticulate obovate lobes 4-5 lines long. On the high mountains, California to Alaska.

* * Loosely tufted, or many-stemmed from a merely woody-persistent base, or wholly herbaceous, with linear or lanceolate or rarely ovate spreading leaves which are little if at all fasciated in the axils: flowers slender-peduncled, solitary or somewhat cymose.

+ Calyx-tube between the strong ribs scarious, inclined to be membranaceous and more or less replicate, forming intervening angles; the narrowly-subulate and mostly rigid teeth shorter than the tube of the corolla: style long and slender, often equalling the tube of the corolla.

P. linearifolia Gray Proc. Am. Acad. viii, 255. Glabrous, sometimes minutely hirsute above, corymbosely much branched from a woody base, 6-10 inches high: leaves very narrowly linear, 1-2 inches long by less than a line wide: tube of the calyx saliently 5-angled from the base by the strong replication of the white-membranaceous sinuses; the lobes nearly acerose: tube of the corolla longer than the calyx; the obovate-cuneate lobes

entire or barely retuse, 6 lines long: ovules 2 in each cell. Along the Columbia river from The Dalles eastward.

P. longifolia Nutt. Jour. Acad. Philad. vii, 41. Nearly glabrous to pubescent, much branched or many-stemmed from a woody base, 3-8 inches high: leaves mostly narrowly linear, 1-3 inches long: calyx more or less angled by the white-membranaceous replicate sinuses: lobes of the corolla obovate or oblong-cuneate, entire or retuse, 3-5 lines long: ovules almost always solitary in the cells. Dry plains, eastern Oregon to Brit. Columbia and the Rocky Mountains.

P. Stansburyi Heller *P. longifolia* var. *Stansburyi* Gray. Conspicuously pubescent throughout, or sometimes glabrate, generally stoutish and somewhat open in growth, 6-8 inches high: leaves from linear to linear-lanceolate 1-3 inches long: pubescence of the branchlets and calyx viscid or glandular: tube of the corolla about twice the length of the calyx; its obovate lobes entire or barely retuse: ovules 1 or 2 in each cell. Dry prairies, eastern Oregon and Washington to the Rocky Mountains.

P. adsurgens Torr. in Herb. Gray l. c. 256. Glabrous except the glandular-pubescent slender pedicels and calyx: stems slender, trailing or ascending, 6-20 inches long: leaves ovate to broadly lanceolate, acute, 5-10 lines long by half as broad, all but the lowest shorter than the internodes: tube of the corolla nearly twice as long as the calyx; its obovate entire or retuse lobes 5-6 lines long: ovules solitary in the cells. In dry open forests southwestern Oregon.

++ Calyx-tube cylindraceous, the thin membranous portion between the ribs not projecting into salient angles: style very short, mostly shorter than the ovary.

P. speciosa Pursh Fl. 149. Stems 1-3 feet high; the branches ascending from a shrubby base, somewhat viscid-puberulent or glandular above: leaves lanceolate or linear, 1-3 inches long, very acute above, sessile with broad base: flowers corymbose: corolla rose color or pink to white; its tube but little longer than the calyx; its obcordate lobes 5-6 lines long: ovules solitary in the cells. Dry ridges and rocky banks, California to Brit. Columbia and the Rocky Mountains.

Var. Sabini Gray l. c. Lobes of the corolla entire or barely retuse: obovate with a narrower cuneate base. Spokane river Washington.

2 CANTUA Juss. Gen. 136.

Very leafy commonly tufted perennials or undershrubs with the leaves all alternate, rarely opposite, and showy flowers either solitary and sessile or few in a cluster at the ends of short branches or branchlets. Calyx tubular to campanulate, the lobes short subulate, pungent. Corolla salverform; the tube more or less exceeding the calyx; the throat somewhat funnelform. Filaments short, inserted in or below the throat: anthers short, included. Ovules numerous in each cell. Seeds with a close coat, developing neither mucilage nor spiral threads when wetted.

C. pungens Torr. Ann. Lyc N. Y. ii, 26. *Gilia pungens* Bent. Puberulent, glabrate, or somewhat viscid: stems woody, usually much branched or tufted, 6-8 inches high: leaves sessile, palmately divided into 3-7 rigid and pungent subulate segments, 4-8 lines long, often with small ones fascicled in their axils: calyx cylindraceous; its subulate lobes

the length of narrowly oblong of eastern Oregon.

Var. Hoodii R. & S. Rigid leaves and California.

Var. squarrosa Nutt. High with virg spreading pungent

Annual or leaves and pycnophyllous. Calyx prescent in fruit; its lobes into revolute the limb 5-lobed: corolla: the filaments. Seeds covered with wetted.

* Annuals with numerous

C. grandiflora Nutt. 1-2 inches high, simple or coarsely branched: leaves nearly so: flowers leafy-bracted cluster: funnelform, the corolla nearly as long as its funnelform, California.

C. linearis Torr. 1-12 inches high: leaves oblong, entire or below, sessile, or pubescent, in a close cluster: leaves longer than the calyx: ovules 1-2 lines long: ovules Manitoba, Minn.

Var. subulata Nutt. Diffusely branched, few in the lower part: brown-like from adjacent parts of

** Annual or quite branched.

C. tinctoria Nutt. Stem slender, 2-3 inches high: pubescent and glandular: lobes 6-14 lines

Along the

glabrous to

3-8 inches

more or less

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the length of the tube; corolla rose white or yellow, 8-12 lines long, the narrowly oblong lobes 4-5 lines long; ovules 8-10 in each cell. Dry plains of eastern Oregon to California, Arizona and Colorado.

Var. Hookeri. *Gilia Hookeri Benth.* Taller, with sparser and more rigid leaves and viscid-pubescent flowering shoots. Eastern Oregon to California.

Var. squarrosa. *Gilia pungens var. squarrosa Gray.* A foot or two high with virgate branches beset with stouter and more rigid recurved-spreading pungent leaves. Dry interior of Washington and Idaho to Nev.

3 COLLOMIA Nutt. Gen. i, 126.

Annual or rarely perennial herbs with mostly entire alternate leaves and purple white or yellow flowers in capitate clusters or cymes. Calyx obpyramidal, 5-cleft, scarious in the sinuses accrescent in fruit, not distended nor ruptured by the maturing capsule; its lobes erect and entire; the sinuses often at length enlarged into revolute lobes. Corolla tubular-funnelform or salverform: the limb 5-lobed. Stamens unequally inserted on the tube of the corolla: the filaments unequal. Ovules few or solitary in each cell. Seeds developing both mucilage and spiral threads when wetted.

* Annuals with strict and leafy stems, entire or merely toothed leaves and numerous flowers in capitate-crowded terminal leafy clusters.

C. grandiflora Dougl. Lindl. Bot. Reg. t. 1174. Stems erect, 6-20 inches high, simple or sparingly branched: leaves lanceolate to linear, entire or coarsely serrate, acute or acuminate, 1-3 inches long, sessile or nearly so: flowers yellow or salmon color, numerous in a dense capitate leafy-bracted cluster: bracts broadly lanceolate to ovate: calyx somewhat funnelform, the triangular lobes about half as long as the tube, glandular: corolla nearly an inch long with a long filiform tube; the oblong lobes about as long as its funnelform throat: ovules solitary in the cells. Common in open woods, California to Brit. Columbia and the Rocky Mountains.

C. linearis Nutt. Gen. i, 126. Viscid-puberulent annual: stem erect, 1-12 inches high, simple or branched: leaves narrowly lanceolate to linear-oblong, entire or few-toothed or few-lobed, acute at the apex, narrowed below, sessile, or the lower short-petioled, 1-2 inches long: flowers numerous, in a close capitate cluster, 5-7 lines long: calyx-lobes triangular-lanceolate, acute: corolla purple to nearly white, with a very slender tube longer than the calyx and but little enlarged throat, the rounded lobes 1-2 lines long: ovules solitary in the cells. Eastern Oregon to Brit. Columbia, Manitoba, Minnesota, Arizona and California.

Var. subulata Gray Proc. Am. Acad. viii, 258, "A low and slender form, diffusely branching from the base: leaves narrow and acute: flowers few in the lower forks: calyx-lobes attenuate-subulate, the tips almostawn-like from a broad base, rather longer than the tube. Nevada and adjacent parts of California and Oregon.

** Annuals usually branching from the base, the flowers in nearly or quite bractless small clusters in the axils and at the ends of the branches.

C. tinctoria Kellogg Proc. Cal. Acad. iii, 17, t. 2. *Gilia aristella* Gray. Stem slender, 2-10 inches high, few-leaved, diffusely branched, minutely pubescent and glandular above: leaves lanceolate-linear, tapering to both ends, 6-14 lines long: flowers 1-3 in the forks and upper axils: calyx cam-

panulate; the lobes attenuate from a broad base to a slender awn: corolla purple, with filiform tube 4-6 lines long and small oblong lobes: capsule obovate, with attenuate base, 3-lobed. On open hillsides in mountains, Brit. Columbia to California.

C. heterophylla Hook. Bot. Mag. 2895. *Gilia Sessei* Don. Diffusely branched from the base, 16 inches high, soft pubescent throughout; leaves thin mostly pinnatifid with the lobes again incised, or bipinnatifid, some of the uppermost less cut or even entire and bract-like subtending the flower-clusters: calyx acute at base, cleft barely to the middle the lobes ovate-lanceolate, acuminate: corolla light purple to pink, slender, 5-6 lines long, 2-3 times as long as the calyx: stamens very unequally inserted: ovules 1-3 in each cell. Common in open woods, Brit. Columbia to California west of the Cascade Mountains.

* * * Perennials with exserted and declined stamens.

C. Mazama Coville Proc. Biol. Soc. of Wash. xi, 35. Glabrous or with a few arachnoid viscid hairs on the stem and leaf-margins, the inflorescence glandular-hairy: stems few to many from a slender perennial tap-root, 6-15 inches high, usually simple: leaves oblong-lanceolate to lanceolate, 1-2 inches long, acute at both ends, acutely and somewhat lacinately 3-5-toothed toward the apex, the upper entire and sessile, the lower often oblanceolate and petioled: inflorescence subcapitately cymose: calyx commonly 4-5 lines long; the triangular-lanceolate acuminate lobes about as long as the tube, enlarging in fruit: corolla about 7 lines long deep blue to violet-purple, funneliform; the narrowly oblong-obovate obtuse lobes 2-3 lines long: anthers and style slightly exserted: seeds linear-oblong, solitary in the cells. On Mount Mazama southern Oregon.

C. debilis Greene Pitt. i, 127. *Gilia debilis* Watson. Minutely pubescent or hirsute and viscid: stems loosely tufted, 2-8 inches long leafy to the top: leaves pedately 3-7-parted or the upper ones 3-cleft, attenuate below to a petiole; the lobes 2-6 lines long, linear-oblong, or the larger more dilated and 2-3-cleft: flowers subsessile and solitary in the forks and axils: calyx cylindraceous; the short subulate teeth but half as long as the tube: corolla funneliform, 6-8 lines long, with elongated tube and deeply cleft limb, light purple to blue: capsule a line long; the cells 1-seeded. In loose volcanic sand on the highest mountain peaks, Oregon and Washington to California and Utah.

C. glutinosa Benth. Bot. Reg. 1833. Slightly pubescent, and glandular above: stem loosely branching, erect or diffuse, 1-2 feet long: leaves nearly simple, or cut or parted into lanceolate or narrowly oblong divisions: flowers loose or scattered: calyx obtuse or rounded at base, deeply cleft; the lobes subulate: stamens moderately unequal in insertion: ovules 1 or 2 in each cell: capsule globular. In open woods, California and Oregon to Washington.

4 LINANTHUS Benth. Bot. Reg. xix, t. 1622.

Erect and slender annuals with opposite leaves and small flowers solitary and terminal or in the forks of the branches. or in capitate leafy-bracted clusters. Tube of the calyx cylindraceous white-scarious except the ribs which are prolonged into acerose linear teeth, not enlarged in fruit but usually ruptured by the maturing capsule. Corolla rotate, campanulate, funneliform, or salverform. Stamens equally inserted on the tube of the corolla. Seeds numerous or rarely few in the cells, developing mucilag when wetted.

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L. filipes Gray.
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L. Bolanderi Gray.
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§ 1 DACTOPHYLLUM. *Gilia* § *Dactophyllum* B. & H. Flowers loose or scattered on slender pedicels. Corolla funnelliform or almost rotate. Stamens inserted in the throat of the corolla: anthers oval.

L. pharnaceoides Greene Pitt. ii; 254. *Gilia liniflora* var. *pharnaceoides* Gray. Stem slender with diffuse filiform branches, 6-10 inches high: leaves palmately 2-5-parted into acerose pubescent segments, 2-6 lines long; flowers paniculate, on filiform pedicels: calyx campanulate, 2 lines long; the triangular acute lobes not as long as the tube: corolla almost rotate, the broad tube hardly as long as the calyx; the broad lobes obovate, rounded at the apex, 2-3 lines long: ovules 6-8 in each cell: capsule shorter than the calyx. Dry sandy plains, eastern Oregon and Washington to California.

L. Harknessii Greene l. c. 256. *Gilia Harknessii* Curran. Stem erect, diffusely branched, 3-10 inches high: seed-leaves oblong-linear: leaves divided to the base into filiform segments, 2-10 lines long: flowers paniculate, on filiform pedicels 6-12 lines long: calyx minutely pubescent; its lanceolate lobes as long as the tube: corolla white, 1-2 lines long; the tube but little longer than the calyx and about as long as the lobes: capsule oval, exceeding the calyx; seeds solitary in the cells, smooth, turgid, oblong, a line long. In bare places on the high mountains, Washington to California.

L. filipes Greene l. c. *Gilia filipes* Benth. Stem slender, 2-4 inches high, diffusely branched: cotyledon leaves obovate: leaves 2-5 lines long, divided to the base into filiform segments: flowers panicled, on capillary pedicels an inch or more long: calyx campanulate, pubescent; its triangular acute lobes not longer than the tube: corolla 2-3 lines long, exceeding the calyx: ovules 3-5 in each cell: capsule about equalling the calyx. On dry plains, eastern Oregon to Nevada and California.

L. Bolanderi Greene l. c. *Gilia Bolanderi* Gray. Stem almost filiform, 2-10 inches high, dichotomously branched: cotyledon leaves oblong, narrowed below to a broad petiole: leaves 2-5 lines long, divided to the base into linear or spatulate segments: flowers on filiform pedicels 1-2 inches long: calyx cylindraceous, pubescent and glandular; its subulate lobes shorter than the tube; corolla 6 lines long; the slender tube exceeding the calyx, much longer than the funnelliform throat and obovate obtuse lobes: capsule oblong, shorter than the calyx: seeds 1-5 in each cell. Dry plains, Oregon to California.

§ 2 LEPTOSIPHON *Gilia* § *Leptosiphon* Enll. Mostly low or slender, with opposite leaves, and small flowers crowded into a capitate leafy-bracted cluster. Corolla salverform, with the tube mostly filiform and elongated: the very short throat commonly more or less cyathiform-dilated. Stamens inserted in the throat or orifice; anthers short. Ovules numerous in each cell.

* Leaves commonly with smaller ones fasciated in their axils and all palmately 5-7-parted into linear segments: filaments slender, exerted more or less from the throat of the corolla, but shorter than its entire lobes: ovules 6-10 in each cell.

L. bicolor Greene l. c. *Gilia tenella* Benth. Rough-pubescent throughout: stem slender, 1-3 inches high, simple or sparingly branched: cotyledon leaves petioled: divisions of the leaves acerose or some of them linear-patulate, 2-6 lines long: tube of the calyx short, cylindraceous; its subulate lobes several times longer: tube of the corolla filiform, 10-12 lines long,

much longer than the bracts and calyx, abruptly widened into the obconic throat and oblong obtuse lobes: flowers purple to pink or straw-color; with yellow throat. Common on dry open hillsides, Puget Sound to California.

L. ciliatus Greene l. c. 260. *Gilia ciliata* Benth. Rough-pubescent throughout: stem rigid, 4-12 inches high, virgate: divisions of the leaves acerose, 2-8 lines long: tube of the calyx cylindraceous, half as long as the subulate pungent lobes: tube of the corolla filiform, 4-6 lines long, but little if any longer than the hispid-ciliate bracts and calyx: throat of the corolla funnelliform, yellow, nearly as long as the oblong rounded lobes. In groves, southern Oregon to California.

* * Wholly glabrous: very dwarf: leaves entire: anthers sessile in the throat of the corolla, the cuneate lobes of which are sometimes undulate-toothed or 1-3-dentate at the apex: ovules 10-16 in each cell.

L. nudicaule. *Gilia nudicaulis* Gray. Very glabrous: stem 1-4 inches high, at length branching from the base, leafless from the cotyledons to the inflorescence which is a close head or glomerule subtended by an involucre of several ovate-lanceolate or lanceolate foliaceous bracts: corolla white, pink or yellow; the tube 3-4 lines long, about 3 times as long as the calyx, rather longer than the lobes. Sandy plains, interior of Oregon to Nevada and Colorado.

5 NAVARRETIÆ Ruiz & Pavon Prodr. Fl. Per. et Chil. 20.

Low annuals with alternate pinnatifid leaves and small flowers in leafy-bracted capitate clusters. Tube of the calyx scarious between the 5 prominent green angles or costa, its lobes unequal, erect or spreading, pungent tipped, all entire, or the 2 larger ones spinulose-toothed or cleft. Corolla tubular-funnelform or almost salverform, with rather small oval or oblong lobes. Stamens inserted in or below the throat: anthers short. Capsule dehiscent from above or from below, or indehiscent. Seeds one to many in each cell, mostly mucilaginous and developing spiral threads when wetted.

* Some of the leaves and bracts more than once pinnately parted, that is their primary divisions incised or parted.

+ Herbage very glandular-viscid and unpleasantly aromatic-scented: stamens included in the throat of the corolla, commonly unequal in length and slightly so in insertion: ovules and seeds 8-12 in each cell:

N. squarrosa H. & A. Bot. Beech. 368. *Gilia squarrosa* Gray. Very glandular-viscid: stem rather stout and rigid, 3-12 inches high, simple or much branched: leaves twice pinnatifid, or pinnately parted and the divisions either parted or incised; upper ones and bracts spinescent: lobes of the calyx subulate and spinescent-tipped, mostly entire, longer than the tube: corolla blue to whitish, 4-6 lines long, with slender tube and funnel-form throat, but little surpassing the calyx: capsule ellipsoid, inclined to be stipitate. Common on plains and along roadsides, western California and Oregon to Brit. Columbia.

+ + Herbage neither viscid nor glandular: stamens exserted out of the throat of the corolla, at length mostly equalling the lobes: ovules 1-4 in each cell.

N. stricta. Stem strict, 4-6 inches high, divaricately branched above: leaves few, bipinnate, the divisions all spinose: bracts similar to the leaves

white-pubescent, very unequal in length, not exceeding the capsule obovoid.

N. intertexta Benth. Acid nor glandular: rather stout; leaves divisions sparingly: calyx and base of its unequal spinose and seeds 3-4 in each cell and the Rocky Mountains.

N. Sukadorfii Benth. branched; leaves of linear lobes not the subtending lobes than the cylindrical sinuses; the small stamens as long as the tube. Low grounds, interior of Oregon. Mr. Sukadorf. and 3-lobed calyx-teeth.

N. minima Benth. tufts, $\frac{1}{2}$ -2 inches high, few divisions: filiform pinnate: tube of the capsule entire lobes in each cell: capsule and Washington.

N. Breweri Benth. much branched: glandular-pubescent: subulate divisions: to the leaves: the unequal entire lobes of the stamens and style in each cell. Southeastern California.

N. leucocephala Benth. pubescence at the base of the stem, 4-10 inches high, slender-spinulose: bracts barely pungent: calyx equalling the subulate lobes: stamens exserted: California.

* * Leaves **N. divaricata** Benth. 4-6 inches high divaricately branched and filiform: the bracts of the calyx pubescent; the corolla rather slender: calyx-teeth: stamens exserted: California, in the mountains.

N. atractylodes Benth.

NTHUS
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the obconic color; with not exceeding the bracts: stamens about equalling the oblong corolla-lobes: capsule obovoid few-seeded: seeds winged. Southwest Oregon.

N. intertexta Hook. Fl. ii, 72. *Gilia intertexta* Steud. Neither viscid nor glandular: stem erect, simple or widely branched, 4-8 inches high, rather stout; leaves nearly glabrous with divaricate acerose spinescent divisions sparingly divided or simple: flowers densely glomerate: tube of the calyx and base of the bracts strongly villous with white spreading hairs; its unequal spinescent and entire lobes equalling the white corolla: ovules and seeds 3-4 in each cell. In damp places, Brit. Columbia to California and the Rocky Mountains.

N. Sukasdorffii. Low and depressed, or erect, 1-3 inches high, much branched; leaves linear, an inch or two long, entire or with a pair or two of linear lobes near the base, not spinose: flowers in dense globular heads, the subtending bracts bipinnate with spinose lobes: lobes of the calyx shorter than the cylindraceous tube, which is but slightly contracted at the sinuses; the smaller ones entire: corolla white, barely exceeding the calyx: stamens as long as the corolla: capsule very thin, 3-seeded: seeds oblong. Low grounds, Falcon Valley, Klickitat Co. Washington. Distributed by Mr. Sukasdorff. as *Gilia minima*, from which it differs in its dense heads and 3-lobed calyx-teeth.

N. minima Nutt. Pl. Gamb. 160. Depressed, often forming broad tufts, $\frac{1}{2}$ -2 inches high glabrate: leaves acicular with simple and few divisions: flowers in small loose heads the subtending bracts spinosely pinnate: tube of the calyx white-hairy in the broad sinuses, as long as the spinose entire lobes which equal or exceed the white corolla: ovules 1-3 in each cell: capsule oblong-obovate, attenuate below. Interior of Oregon and Washington to Arizona and Nebraska.

N. Breweri Greene l. c. 137, *Gilia Breweri* Gray, Erect or at length much branched and diffusely spreading, 1-10 inches high, very minutely glandular-puberulent throughout: leaves with mostly simple acicular-subulate divisions: flowers in lax glomerules; the subtending bracts similar to the leaves: tube of the calyx a line long, 2 or 3 times shorter than the unequal entire lobes: corolla yellow, the slender tube equalling the calyx: stamens and style equalling the oblong corolla-lobes: ovules 1 or 2 in each cell. Southeastern Oregon to Wyoming, Nevada and California.

N. leucocephala Benth, Pl. Hartw. 160. Glabrous except some woolly pubescence at the summit of the stem and scarious calyx-tube: stem slender, 4-10 inches high, seldom rigid: leaves soft, their often simple divisions slender-spinulose: flowers in rather small heads, the subtending bracts with barely pungent divisions: calyx-tube contracted at the sinuses, about equalling the subulate entire lobes: corolla white, longer than the calyx: stamens exserted: ovules 2 in each cell. In wet places, southern Oregon to California

* * Leaves simply pinnatifid or incised or many of them entire.

N. divaricata Greene l. c. *Gilia divaricata* Torr. Stem slender, 1-6 inches high divaricately branched not glandular-viscid but glabrate: leaves slender and filiform, or the upper with acerose divisions and passing into the bracts of the small heads which are palmately 3-5-cleft: calyx woolly-pubescent; the scarious tube much shorter than the unequal entire lobes: corolla rather slender, 3-4 lines long; the slender tube about equalling the calyx-teeth: stamens included: ovules 5-7 in each cell. Washington to California, in the high mountains.

N. atractylodes H. & A. Bot. Beech. 368. Pubescent and very viscid:

rather stout 6-8 inches high, very rigid, especially the leaves and bracts; these lanceolate or the uppermost ones ovate, all pinnatifid and with divaricate subulate-spinose lobes: flowers glomerate: calyx cylindraceous with unequal, entire or 3-cleft, pungent teeth: corolla purple about twice the length of the calyx; ovules 6 or 7 in each cell. On dry ridges, southwest Oregon to California.

6 HUGELIA Benth. Bot. Reg. 1852.

Low floccose-lanate plants with narrow or narrowly lobed alternate leaves and blue or white flowers in leafy-bracted terminal glomerules. Calyx densely woolly, 4-5-lobed, with aceroses or subulate and cuspidate or pungent lobes. Corolla salverform; with ovate or oblong lobes. Filaments filiform, exerted: anthers deeply sagittate. Seeds few in each cell.

H. floccosa. Gilia floccosa Gray. Floccose-woolly, at least when young: stem 2-12 inches high, simple or branched, often diffuse or spreading: lobes of the calyx subulate, unequal, one large and three smaller ones, pungent: corolla yellow with blue or white lobe; its tube 3-4 lines long, surpassing the calyx-lobes: anthers narrowly oblong: seeds 1 or 2 in each cell. Dry plains, southeastern Oregon to California, Utah and Arizona.

7 GILIA Ruiz & Pav. Prodr. Fl. Per. & Chil. 25, t. 4.

Herbs with alternate or opposite simple or compound leaves and various inflorescence. Calyx campanulate or tubular, 5-toothed or 5-cleft, the sinuses usually scarious. Corolla funnelform or salverform, or sometimes campanulate or nearly rotate, regular. Stamens equally or unequally inserted in the tube or in the throat of the corolla: the mostly slender filaments sometimes unequal in length. Ovary oblong or ovoid, 3-celled with solitary or several ovules in each cell. Seeds 1-10 in each cell, usually developing mucilage, and often spiral threads, when wetted.

* Bracts and calyx-lobes commonly cuspidate or aristulate, and pubescent with long and many-jointed somewhat viscid hairs: flowers capitate-congested or sometimes more loosely cymose.

G. congesta Hook. Fl. ii, 75. White-pubescent throughout: root perennial: stems erect or spreading, 3-12 inches long from a tufted base bearing simple terminal or few and corymbose capitate cymes: leaves mostly petioled, $\frac{1}{2}$ -2 inches long, pinnately divided into 3-9 narrowly linear mucronate divisions, or the uppermost entire: calyx campanulate with very short tube and oblong cuspidate-pointed lobes: corolla white with oval lobes nearly as long as the tube, which does not exceed the calyx-lobes: filaments short, at length as long as the anthers: ovules 1-4 in each cell. Dry plains, eastern Oregon to California and Nebraska.

* * Rather tall biennials with thyrsoid-paniculate inflorescence.

G. aggregata Spreng. Syst. i, 626. Somewhat pubescent: stems erect 1-4 feet high, leafy, simple, or sometimes loosely branched: leaves thickish, 1-3 inches long, mostly petioled, pinnately parted into narrowly linear mucronulate segments: flowers in a thyrsoid narrow loose or interrupted panicle, sessile, in small mostly short-peduncled clusters: calyx commonly glandular, 3-4 lines long; the campanulate tube about as long as the subulate teeth: corolla from scarlet to pink or white, 12-18 lines long, tubular funnelform; its lobes ovate or lanceolate, acute or acuminate, 3-4 lines long, widely spreading, soon recurv. 2: stamens inserted in the throat

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below the sinuses of the corolla, not longer than its lobes; filaments slender; anthers short, oblong or oval: ovules numerous in the cells: seeds developing mucilage and spiral threads when wetted. On dry ridges in mountainous districts, California to Brit. Columbia and Nebraska.

* * * Flowers scattered, crowded or rarely capitate-glomerate, inconspicuously bracted or ebractate.

+ Ovules and seeds few or numerous in the cells: stamens inserted in or just below the sinuses: annuals.

-- Corolla more or less funnelliform, having a distinct tube.

= Leaves once or twice pinnately parted or cleft: seeds developing mucilage and spiral threads when wetted.

G. capitata Dougl. Hook. Bot. Mag. t. 2698. Nearly glabrous: stem rather slender, usually 1-3 feet high, paniculately branched: leaves 2-3-pinnately divided into slender or even filiform lobes: flowers numerous, in dense capitate clusters terminating long naked peduncles: calyx glabrous or nearly so, the lanceolate acuminate lobes not longer than the campanulate tube: corolla blue to white, 4-5 lines long; its tube about as long as the narrowly oblong or lanceolate-linear lobes: stamens inserted in the very sinuses of the corolla and equalling its lobes: anthers elliptical. Common in open places and fields, California to Brit. Columbia.

G. achilleifolia Benth. Bot. Reg. 1622. Somewhat pubescent: stem rather stout, 1-2 feet high, loosely branched above: leaves once or twice pinnately parted into linear lobes: flowers numerous, in dense capitate clusters terminating long peduncles: calyx pubescent; its ovate almost epinose-tipped lobes longer than the tube: lobes of the blue corolla obovate or broadly oblong; its throat abruptly and amply dilated: stamens inserted in the sinuses of the corolla and about equalling its lobes. Western California and Oregon to Brit. Columbia.

G. inconspicua Dougl. Hook. Bot. Mag. t. 2883. Viscid, and usually with slight woolly pubescence when young: stem stoutish, 4-12 inches high, branching from the base: leaves mostly pinnatifid or pinnately parted, or the lowest bipinnatifid with short cuspidate lobes, the upper becoming small, subulate and entire: flowers somewhat crowded and subsessile, or at length loosely panicle and some of them slender-pedicelled: calyx 2 lines long, the short subulate teeth not half as long as the tube: corolla narrowly funnelliform, with proper tube shorter or slightly longer than the calyx: seeds several in each cell. Dry hillsides and sandy plains, California and eastern Oregon to Brit. Columbia and the Rocky Mountains.

Var. sinuata Gray Proc. Am. Acad. viii, 278. Corolla becoming thrice the length of the calyx, with the tube more exerted, with the throat and lobes more ample. Dry plains, eastern Oregon to California and N. Mex.

= = Seeds destitute of mucilage and spiral threads when wetted.

G. gracilis Hook. Bot. Mag. t. 2924. Stem stout, simple, or at length corymbosely much branched and spreading. 2-10 inches high: leaves linear or the lower ones obovate to lanceolate, entire, sessile, the lower ones mostly opposite, 4-10 lines long: calyx rounded at base, deeply cleft, with strongly carinate subulate lobes: corolla about 5 lines long, purple or violet, the slender tube yellowish, and seldom longer than the calyx: seeds flat and somewhat winged. Common in open places, Brit. Columbia to California and Nebraska.

G. leptomeria Gray l. c. Somewhat glandular-viscid: stem 6-12 inches high: leaves mainly radical, oblong or broadly lanceolate, incisely toothed or sinuate-pinnatifid the obtuse teeth or lobes minutely cuspidate; the cauline small and reduced upward to the subulate bracts of the open

effuse cymose panicle; flowers inconspicuous; corolla white, 2-3 lines long, fully twice the length of the calyx, slender-funnelform, with very small acute lobes: capsule ovoid, equalling or exceeding the triangular acute calyx-teeth. Eastern Washington and Oregon to Nevada and Utah.

G. hispida Piper *Erythra* vi. 30. " Annual, prostrate, 3-5 inches in diameter, hispid throughout with white hairs; stems usually purplish, branched from the base in a falsely dichotomous manner, the branches curving inward in age; leaves all alternate, spatulate-lanceolate, acutish or the earliest truly spatulate and obtuse, 6-12 lines long, all tapering to a narrowed base; midrib prominent in age, the veins not visible: flowers solitary and sessile in the forks or terminal, the latest ones loosely crowded in very leafy capitate clusters: calyx green, very hispid, the lobes nearly equalling the corolla, becoming scarious at base in age; corolla pinkish, tubular, 4 lines long, the lobes very short and obtuse, very slightly dilated in the throat, sparsely hispid above both within and without; stamens unequally inserted, entirely included in the lower half of the tube: ovary 2-celled; style short, one-half the length of the corolla: mature capsule oblong, 1-2 lines long with about eight ventricose swellings on each valve marking the position of the seeds; seeds 10-12, black, wrinkled, the coats not developing mucilage when wetted. In drifting sand at Pasco Washington.

++ Pedicels slender or filiform, scattered, becoming horizontal or reflexed: corolla campanulate or rotate.

G. micromeria Gray l. c. Nearly glabrous, glandless, effusely much branched; branches filiform: radical and lower leaves pinnatifid, with obtuse lobes; the upper linear and entire: pedicels capillary, 6-7 lines long, axillary, or opposite leaves: flowers barely a line long: corolla campanulate, white, a little longer than the 5-cleft calyx: capsule globular, few-seeded. Northwest Nevada, to be looked for in adjacent Oregon.

G. filiformis Parry, Gray Proc. Am. Acad. x. 75. Completely glabrous and smooth: stem erect with filiform spreading branches: leaves all filiform or nearly so, entire: pedicels scattered, capillary, at length refracted: corolla cream-color, very open-campanulate, 2 lines long, deeply 5-cleft, exceeding the 5-parted calyx; its lobes truncate and obscurely erose-dentate: capsule globular: seeds few, developing mucilage but not spiral threads when wetted. Eastern Washington to Utah.

+ + Much branched annuals with filiform or slender-subulate and entire or sometimes 3-parted leaves and short-campanulate 5-toothed calyx: flowers scattered, small: stamens inserted on and included in the tube of the corolla: ovules solitary in the cells.

G. minutiflora Benth. DC. Prodr. ix, 315. Glabrous or minutely glandular-puberulent above: stem erect, 10-20 inches high, with many virgate and rigid, slender branches: upper leaves all reduced to minute subulate appressed bracts, the lower larger and some of them 3-parted: flowers 2 lines long, terminal and spicately disposed along the branchlets: tube of the corolla about twice the length of the calyx and of its own lobes: filaments slender: capsule ovoid: seeds oblong. Eastern Washington and Oregon to Idaho and Wyoming.

G. tenerrima Gray Proc. Am. Acad. viii, 277. Minutely and sparsely glandular: stem 4-10 inches high, effusely much branched with filiform branches: leaves entire, linear-lanceolate: flowers loosely paniced, on slender divergent pedicels, minute: calyx campanulate, the lanceolate lobes equalling the tube: lobes of the corolla oblong, as long as the calyx: capsule globular: seeds turgid-oval. Southeastern Oregon to Utah.

G. capillaris Kellogg Proc. Cal. Acad. v. 49. Slender annual 2-18 inches high, glandular, otherwise glabrous, branching into an effuse pan-

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icle: leaves 6-20 lines long or the uppermost reduced to small subulate bracts, entire or the lower sometimes with 2 or 3 small lobes: peduncles filiform or capillary: calyx small; its lobes subulate: corolla pink-red, 5-10 lines long; its slender tube longer than the calyx, and rather abruptly expanded into a wide funnelform throat of about the length of the oval spreading lobes. On wet banks, California to Washington.

G. linearifolia. Minutely glandular: stem slender, 6-12 inches high, branching into an effuse panicle: leaves linear, 6-12 lines long, attenuate at both ends: peduncles filiform: calyx a line long, with short-oblong triangular-pointed lobes: corolla with a slender tube longer than the calyx, gradually expanded into a funnelform throat of about the length of the oblong lobes. In moist places, southern Oregon.

8 POLEMONIUM Tourn. Inst. 146, t. 61.

Herbs with alternate pinnate or pinnately parted leaves, and mostly showy flowers in cymose panicles, or racemes, or thyrsiform. Calyx herbaceous throughout, neither angled nor costate, slightly accrescent and loosely investing the capsule, campanulate or narrower, cleft to the middle, the lobes equal, erect or connivent over the capsule, or campanulate-spreading, entire. Corolla regular, from funnelform to nearly rotate. Filaments more or less declined, and usually pilose-appendaged at base, slender. Ovules few or several in each cell. Seeds angular or winged, developing mucilage when wetted.

§ 1 Root annual. Flowers solitary, opposite the leaves. Corolla almost rotate, shorter than the broad and open deeply 5-cleft calyx. Filaments almost naked at base.

P. micrantha Benth. DC. Prodr. ix, 318. More or less viscid-pubescent: stem 2-8 inches long, diffusely much branched from the base: leaflets 5-13, obovate to lanceolate, 2-4 lines long: calyx truncate at base, the broadly lanceolate lobes 2 lines long, twice as long as the broad tube: peduncles mostly solitary, opposite the leaves or terminal: corolla white, a line or two long: ovules 1-3 in each cell: capsule globose, shorter than the calyx. In moist places, California to Brit. Columbia, east of the Cascade Mts.

§ 2 Root perennial. Leaflets simple and entire, sometimes confluent. Inflorescence open and with very few bracts. Corolla campanulate-funnelform with tube not surpassing the open-campanulate calyx, and shorter than the ample spreading limb. Filaments usually dilated and pilose-appendaged at base.

* Stem 6-10 inches high, from caespitose-branching and mostly thickened rootstocks: leaflets seldom 6 lines long: flowering stems only 1-3-leaved: flowers cymulose.

P. elegans Greene Pitt. iii, 305. Very viscid-pubescent throughout except the corolla: stems slender, 2-6 inches high; simple or sparingly branched above: leaflets very numerous somewhat crowded, obovate to elliptical, a line or two long: flowers in a small cymulose cluster; calyx campanulate, cleft to the middle, with broadly lanceolate lobes: corolla blue with yellow throat, 6-7 lines long, the broadly obovate lobes equalling the tube: filaments pilose at base: style barely exerted: capsule ovoid, much shorter than the calyx, few-seeded. On Mount Adams Washington near perpetual snow.

P. humile Willd. in Rœm. & Sch. Syst. iv, 792. Somewhat pilose

below, pubescent above: stems rather stout, 4-8 inches high, corymbosely branched: leaflets 15-21, oblong to broadly lanceolate, or some of the lower ones obovate, 4-8 lines long: flowers in cymulose clusters: calyx open-campanulate, 2-3 lines long, cleft to the middle, with short triangular lobes: corolla pale blue or purplish, 4-6 lines long; its ample rounded lobes much longer than the tube: filaments pilose and dilated at base: ovules 2-4, and seeds 1 or 2 in each cell. On the highest mountains, California to the Arctic coast and the Rocky Mountains.

P. pulchellum Bunge in Ledeb. Fl. Alt. i, 233. Minutely puberulent and viscid-glandular: stems rather slender, sparingly branched, 6-10 inches high: leaflets 9-21, oblong to lanceolate: flowers in cymulose clusters, mostly slender-pedicel: calyx narrowly campanulate, cleft to below the middle, 2-3 lines long: corolla blue with white tube, 6-8 lines long, the ample oblong lobes much longer than the short tube: filaments pilose but not dilated at base: capsule obovoid, much shorter than the calyx: ovules 2-4 and seeds usually 1 in each cell. On high mountains, Oregon to Alaska and the Rocky Mountains.

* * Tall, from slender rootstocks or roots: leaves and leaflets comparatively large.

+ Stems erect, 1-3 feet high: leaflets numerous and mostly approximate, not rarely confluent or the rachis winged: ovules 6-13 in each cell.

P. occidentale Greene Pitt. ii, 75. *P. cœruleum* of authors as to our plant. Either glabrous or viscid-pubescent: stem strict and virgate, 2-3 feet high, from running rootstocks, 5-10-leaved: leaflets 15-23, from linear-lanceolate to oblong-ovate, 5-20 lines long: flowers numerous, in a naked and narrow thyrsus or panicle: calyx cleft to or below the middle, with short lanceolate lobes: corolla blue, an inch or less in diameter, the obovate lobes much longer than the tube: filaments densely bearded at base, often equalling the corolla-lobes: style exserted. In springy places on high mountains, California to Alaska and the Rocky Mountains.

P. foliolissimum Gray Syn. Fl. ii, 151. Very viscid-pubescent throughout and strong-scented: stems a foot or more high, very leafy: leaflets from lanceolate to ovate-lanceolate: flowers corymbose-cymose, small: corolla commonly white or cream-color, sometimes violet, twice as long as the calyx which is 5-cleft to or beyond the middle: style and stamens not exserted. Idaho to the Rocky Mountains and New Mexico.

P. pectinatum Greene Bull. Cal. Acad. i, 10. Glabrous or the inflorescence viscid-pubescent: stems clustered, a foot or more high, slender, leafy to the summit: leaflets linear-filiform, an inch long, in about 5 pairs: flowers corymbose-cymose: calyx cleft to beyond the middle: corolla half-inch broad, white or cream-color: seeds wingless. Collected in eastern Washington by Prof. E. W. Hilgard in June 1882.

+ Herbage glabrous or slightly pubescent, neither viscid nor glandular: stems lax, with diffuse branches and open corymbiform or paniculate inflorescence: leaflets fewer and rather large, membranaceous, only the ultimate at all confluent: style and stamens rather shorter than the corolla: ovules only 3-4 in each cell.

P. carneum Gray l. c. Stems rather stout 1-2 feet high: leaflets 5-15, from ovate to oblong-lanceolate, 6-18 lines long: branches somewhat umbellately 3-5-flowered: pedicels slender, pubescent: calyx campanulate, 3-10 lines long, pubescent; the lanceolate acute lobes longer than the tube: corolla salmon-color or flesh-color, 12-18 lines broad, the ample rounded obovate lobes thrice longer than the tube: filaments slender, villous at the slightly dilated base: capsule oblong not longer than the tube of the calyx: seeds 2 or 3 in each cell. In damp places, southwestern Oregon to Calif.

P. amœnum 6-24 inches high: stem erect, slightly winged: leaflets linear-lanceolate, sessile or short-petioled, truncate, open, to 9-foliate; calyx 5-lobed, acute lobes about 1/2 inch long, the broad oblong lobes appendaged: flowers in cymulose clusters, Cheh.

P. luteum. Stems erect, leafy, cymose: flowers small, acute, or the lower ones smaller: at the base, the corolla yellow, 8-10 lines long as the tube: the corolla-lobes.

§ 3 Leaflets ciliate. Inflorescence strictly or even more or less oblong or lobes. Filaments inserted on the higher.

P. confertum Stems from a tufted base: petioles of leaves at base: as if in fascicles: flowers dense: long, its round peak points on the California.

ORDER LXIV Herbs, or rarely shrubs, or sometimes scandent or scorpioid branches: commonly reduced to a single leaf which in the calyx 5-parted: ovary. Hypogynous. Corolla at the base or lobes distinct or partially distinct. Ovary many, pendulous: 2-valved capsule: 2-celled: even complete with a close and

P. amœnum Piper *Erythea* vii, 174. "Perennial, erect, or nearly so, 6-24 inches high, glabrous below, sparsely viscid-puberulent above; stems terete, slightly wing-margined; cauline 4 or 5, 18 inches long; leaflets 15-21, lanceolate, sessile, attenuately acute, 1-2 inches long; inflorescence leafy-bracteate, open, the flowers in clusters of 2-4 on slender peduncles; bracts to 9-foliolate; calyx deeply 5-cleft, 5 lines long, viscid-pilose, the narrow acute lobes about twice as long as the tube; corolla pale blue, 6-10 lines long, the broad obtuse lobes exceeding the tube; filaments dilated at base, lose-appendaged; style 3-cleft at the apex included; seeds 3-4 in each cell. Tumtulis, Chehalis Co. Washington."

P. luteum. Slightly pubescent: stems slender, ascending, 6-18 inches long leafy, cymosely 3-9-flowered: leaflets 11-21, oblong to almost lanceolate, acute, or the terminal ones rounded at the apex, 2-8 lines long, the lower ones smallest: calyx open-campanulate, 4-6 lines long, cleft nearly to the base, the ample lobes lanceolate, often more or less acuminate: corolla yellow, 8-10 lines long, the ample obovate lobes 3 or 4 times as long as the tube: filaments slender, pubescent at base, about half as long as the corolla-lobes. In forests of the Cascade Mountains Oregon.

§ 3 Leaflets very small and crowded so as seemingly to be verticillate. Inflorescence capitate-congested or spiciform. Corolla strictly or even narrowly funnelform; its tube more or less exceeding the oblong or cylindrical calyx, prominently longer than the lobes. Filaments naked or nearly so, not dilated at base, usually inserted on the middle of the tube, or occasionally adnate higher.

P. confertum Gray Proc. Acad. Philad. 1863. Stems 10-12 inches high from a tufted rootstock, glandular-pubescent and viscid, musky-fragrant: petioles of the radical leaves conspicuously scarious-dilated and sheathing at base: leaflets 1-3 lines long, mostly 2-3-divided and so appearing as if in fascicles or whorls; the divisions from round-oval to oblong-linear: flowers densely crowded, heavy-scented: corolla deep blue, 6-12 lines long, its rounded lobes 2-3 lines long: ovules about 3 in each cell. Peak points on the highest mountains Idaho to the Rocky Mountains and California.

ORDER LXIV HYDROPHYLLACEÆ Lindl. Nat. Syst. 271.

Herbs, or rarely shrubs, with colorless insipid juice, alternate or sometimes opposite leaves without stipules, and mostly scorpioid bractless inflorescence or the scorpioid cymes more commonly reduced to geminate or solitary false spikes or racemes, which in descriptions may be termed spikes or racemes. Calyx 5-parted or nearly 5 sepalous inferior and free from the ovary. Hypogynous disk at the base of the ovary often conspicuous. Corolla regularly 5-lobed, with the 5 stamens borne on the base or lower part, and alternate with its lobes. Styles distinct or partly united, or rarely completely united: stigma terminal. Ovules amphitropous or anatropous, from 4 to very many, pendulous or when numerous almost horizontal. Fruit 2-valved capsule, 1-celled with 2 parietal placenta, or incompletely 2-celled by the approximation or meeting of the placenta, or even completely 2-celled by their union in the axis. Seeds with a close and usually reticulated or pitted coat, and a small

or slender embryo in cartilaginous or firm-fleshy albumen.

TRIBE I Ovary and capsule strictly 1-celled, lined with a pair of expanded placentæ. Capsule loculicidally dehiscent

- 1 **Hydrophyllum** Root perennial or biennial: leaves all alternate: calyx nearly unchanged in fruit: style and stamens exserted.
- 2 **Nemophila** Root annual: some or all of the leaves opposite: calyx enlarged in fruit: stamens and style shorter than the corolla.

TRIBE II Ovary either strictly 1-celled or 2-celled by the meeting of the narrow placentæ in the axis.

* Leaves all or all but the lowest alternate.

+ Style 2-cleft, at least at the apex.

- 3 **Phacelia** Corolla not yellow, deciduous: stamens equally inserted low down on the corolla.
- 4 **Emmenanthe** Corolla yellow or yellowish, persistent: stamens equally inserted low down on the corolla.
- 5 **Conanthus** Corolla purple, deciduous, funnellform; the slender filaments unequally inserted more or less high up on its tube.
+ + Style and even the stigma entire.
- 6 **Romazoffia** Corolla white or pink, funnellform; the stamens inserted on the base of the tube.

** Leaves and 1-flowered peduncles all radical: style 2-cleft at the apex.

- 7 **Capnorea** Corolla campanulate or rotate, with the stamens inserted on its base.

TRIBE III Ovary completely or incompletely 2-celled. Capsule loculicidal bearing the half dissepiments on their middle.

- 8 **Nama** Mostly low herbs: capsule membranaceous, the valves and placentæ undivided.
- 9 **Eriodictyon** Shrubby plants: capsule crustaceous, loculicidal the septicidal, thus apparently 4-valve1.

Tribe 1 *Hydrophyllæ* B. & H. Gen. ii, 825. Calyx sometimes appendaged at the sinuses. Corolla mostly convolute in the bud. Style more or less 2-cleft at the apex. Ovary hispid, at least at the apex, strictly 1-celled, lined with expanded, at first fleshy, at maturity thin and membranaceous placentæ, which form a lining to the pericarp, and enclose 1 or more amphitropous ovules. Capsule globose, Seeds by abortion commonly fewer than ovules, globular angled by mutual pressure: albumen cartilaginous.

1 HYDROPHYLLUM Tourn. L. Gen. n. 204.

Perennial herbs with alternate petioled and lobed or divided leaves and small flowers in terminal scorpioid racemes or heads on long naked peduncles. Calyx early open, without appendage at the sinuses, nearly unchanged in fruit. Corolla campanulate the tube within bearing a linear longitudinal appendage opposite each lobe with infolded edges, forming a nectariferous groove

Filaments slender linear or oblong. Seeds 1-

H. capitatum Root with minute hispid with minute small fascicle of leaves, erect in petioled, exceeding the lanceolate distal tip: flowers nearly to the base of the tube a little longer than the tube, oblong, attached to the tube a line in diameter east of the Casca

H. occidentale Root sparingly hispid fibrous roots, 12-15 line, pinnately pinnate, obtuse divisions surpassing the sub deeply parted, its color violet-purple, 4-5 Washington to Ca

Var. Fendleri Root all canescent or glabrous, pinnate, incisely white or nearly so Colorado and New M

H. Virginicum Stems few or solitary very long-petioled lobes or divisions acuminate, corolla terminal on the leaves, usually to the very base of the corolla nearly white more than twice as long as the middle. In rich

2 NEMOPHILA

Annuals with usually large calyx deeply 5-lobed in each lobed with 10 appendages usually sagittate deciduous or more N. Menziesii diffusely branched the long leaves parted into round

Filaments slender. long-exserted, bearded at the middle; anthers linear or oblong, inflexed in the bud. Style slender, long-exserted. Seeds 1-4, ovules only four.

H. capitatum Dougl. Benth in Linn. Trans. xvii, 273. Retrorsely hispid with minute white hairs: stems often tufted. 4-12 inches high from a small fascicle of thickened perennial perpendicular roots: one-several leaved, erect in flower, recurving and often prostrate in fruit: leaves long-petioled, exceeding the stems, pinnately 5-7-parted or at base divided; the lanceolate divisions entire or often 2-3-lobed or 2-3-cleft, all mucronate-tipped: flowers in a dense capitate cluster: calyx very hispid, parted nearly to the base, with linear-oblong, obtuse divisions: corolla blue, but little longer than the calyx: filaments twice as long as the corolla; anthers oblong, attached near the middle; style equalling the stamens, 2-lobed: seed a line in diameter. Under shrubs &c. Brit. Columbia to California east of the Cascade Mountains.

H. occidentale Gray Proc. Am. Acad. x, 314. Pubescent, hirsute, or sparingly hispid: stems erect, usually numerous from a fascicle of fleshy-fibrous roots, 12-18 inches high: leaves elongated-oblong in general outline, pinnately parted or divided into 7-15 oblong, mostly incised or cleft obtuse divisions 1-2 inches long: peduncles rather slender, elongated, often surpassing the subtending leaf: cymes mostly dense or capitate: calyx deeply parted, its divisions lanceolate and rather obtuse: corolla white to violet-purple, 4-5 lines long: anthers oblong-linear. In moist shady places, Washington to California.

Var. Fendleri Gray l. c. Pubescence mainly hirsute or hispid, not at all canescent or cinereous: divisions of the leaves broader, acute or acuminate, incisely serrate: peduncles shorter: cyme rather open: corolla white or nearly so. In shaded ravines, Mount Adams Washington to Colorado and New Mexico.

H. Virginicum L. Sp. 146. Pubescent with short scattered hairs: stems few or solitary from a short scaly rootstock, 1-2 feet high: leaves very long-petioled, ovate or cordate in outline, 3-5-parted or divided, the lobes or divisions 2-4 inches long, ovate-lanceolate to rhombic-ovate, acute or acuminate, coarsely incised-toothed, the lowest commonly 2-cleft, and the terminal one often 3-lobed: peduncle elongated, at length surpassing the leaves, usually once or twice forked; cymes at length open: calyx parted to the very base into linear and spreading hispid-ciliate acute divisions: corolla nearly white, or sometimes deep violet, 3-4 lines long: filaments more than twice as long as the corolla; anthers oblong, attached below the middle. In rich damp woods, Oregon to Alaska and across the Continent.

2 NEMOPHILA Nutt. Jour. Acad. Phila. ii, 179.

Annuals with mostly opposite and usually pinnatifid leaves, and usually large flowers on rather long axillary peduncles. Calyx deeply 5-cleft or 5-parted, with a reflexed or spreading appendage in each sinus, enlarged in fruit. Corolla rotate or nearly campanulate, usually longer than the calyx: the base within most with 10 appendages. Stamens shorter than the corolla: anthers usually sagittate-oblong, Ovules 4-20. Seeds commonly with a deciduous or more persistent caruncle.

N. Menziesii H. & A. Bot. Beech. 125. Sparingly strigose-pubescent: diffusely branched from the base, the branches mostly prostrate, 2-10 inches long: leaves oblong in outline on rather short winged petioles, 3-4 parted into rounded obovate lobes 1-2 lines long: peduncles 2-3 inches

long: calyx hirsute, deeply parted, with lanceolate lobes and linear appendages: corolla an inch or less in diameter, rotate, the ample obovate lobes white or light blue speckled with dark blue: scales at the base of the short tube narrow, wholly adherent their free edge densely hirsute-ciliate: ovules 8-24: seeds 5-15, globular, with a very prominent papilliform caruncle. Common in open places, Willamette Valley Oregon to California.

N. pedunculata Dougl. Hook. Fl. ii, 79. Minutely hispid: stems slender, 2-6 inches high, paniculately branched: leaves bipinnatifid or the upper ones pinnate only, with rounded lobes: calyx 5-parted, with oblong acute lobes, the appendages in the sinuses very small or obsolete: corolla white, 4-5 lines broad, the obovate emarginate lobes longer than the tube and surpassing the calyx; appendages in the throat broad and glabrous: stamens inserted on the base of the corolla and not longer than its tube: ovules: a pair to each placenta: seeds globose; the caruncle at length evanescent. In damp places, southern Oregon to California.

N. parviflora Dougl. Hook. Fl. ii, 79. Rough-pubescent with short retrorse hairs: stems slender, 4-16 inches long branching from the base prostrate or ascending: leaves broadly ovate in outline 6-10 lines long by 4-8 lines broad, pinnately 5-lobed, with ovate acute and mucronate lobes the lower sometimes coarsely 2-3-toothed; petiole shorter than the blade: peduncles slender, an inch or less long in fruit: calyx 2 lines long or less, deeply 5-lobed with lanceolate lobes inconspicuous linear appendages: corolla white, campanulate, but little longer than the calyx, the rounded obovate lobes longer than the tube, the appendages in the throat linear and glabrous, or almost obsolete: stamens inserted on the base and not exceeding the tube of the corolla: anthers short, cordate, very obtuse: ovary 4-ovuled, very hispid: capsule much longer than the calyx, 1-4-seeded. Common in forests, western Oregon and Washington.

N. densa. *N. parviflora* Gray in part. Sparingly pilose: stem somewhat succulent, decumbent and spreading from the base, forming dense round mats 2-3 inches in diameter: leaves oblong in outline, 6-7 lines long by 2-4 lines broad, pinnately 7-parted, with obovate, barely apiculate lobes: calyx $1\frac{1}{2}$ lines long, with subulate lobes and linear appendages: corolla blue, campanulate or more open, twice as long as the calyx: the broad lobes longer than the tube: the ovary 4-ovuled, pubescent: capsule longer than the calyx, 1-4-seeded. Under small trees in open places Washington to California.

N. breviflora Gray Proc. Am. Acad. xi, 315. Stem erect, 4-10 inches high, weak, branching from the base: leaves sometimes all alternate, pinnately 5-parted, the divisions approximate, oblong-lanceolate, acute, entire, 3-9 lines long: peduncles seldom exceeding the petioles: appendages of the calyx nearly half the length of the proper lobes, both ciliate, with long hirsute bristles: corolla whitish or tinged with violet, broadly short-campanulate, decidedly shorter than the calyx; the lobes considerably shorter than the tube; appendages in the throat cuneate, the broad free summit finely briate-incised: style minutely 2-cleft at the apex: seed usually solitary almost filling the cell, globular, nearly smooth and even; the caruncle evanescent. In the Blue Mountains of Oregon.

Tribe 2 Phaceliæ B. & H. Gen. ii, 826. Calyx naked at the sinuses, deeply 5-parted. Corolla imbricated in the bud. Style from 2-parted to entire: the branches at the apex or the stigmas obscurely if at all thickened. Ovary mostly hispid or pubescent, at least at the apex, either strictly 1-celled or 2-celled by the meeting of the linear or lanceolate placentæ in the axis: these separating in the loculicidal dehiscence and borne on the middle of the semiseptif-

erous valves,

Annual or leaves, and racemes, of or nearly so thrown off by with or some generally in pairs either the slender fr corolla. Ov nearly as lon

§ EUPHAC late corolla e at the base Seeds as mar or favose.

* Lower l of the cyme h

P. Pringle high from an an entire, tapering calyx-lobes line panulate blue c not hollowed v ern California.

* Pubescen the cyme scoo dages of the the base of th

+ Leaves 3-5-parted or acute: seeds c

P. nemoral year from seed, and destitute c lower ones mo inches long, pet cemes geminate greenish-yellow globose; the ob low, connivent ovate, acutish, ton to Californ

P. mutabil to 18 inches hi few and ascend out, and with leaves of thin t the radical wit

erous valves, or sometimes falling away.

2 PHACELIA Juss. Gen. 127.

Annual or perennial herbs with alternate simple or compound leaves, and more or less scorpioid cyms, or so called spikes or racemes, of blue purple or white flowers. Calyx-lobes all similar or nearly so, more or less enlarging in fruit, deciduous, at least thrown off by the enlarging capsule, except in *P. sericea*; the tube with or sometimes without appendages within: these when present generally in the form of 10 vertical folds or lamellar projections in pairs either adnate to or free from and alternate with the base of the slender filaments. Stamens equally inserted low down on the corolla. Ovules and seeds when reduced to a pair collateral and nearly as long as the cell. Seed-coat reticulated or pitted.

§ EUPHACELIA B. & H. Gen. ii, 818. Lobes of the campanulate corolla entire; the tube with 10 laminate appendages in pairs at the base of the stamens. Ovules a pair to each placenta. Seeds as many as ovules, or by abortion fewer, areolate-reticulate or favose.

* Lower leaves and all the branches opposite: spikes or branches of the cyme hardly at all scorpioid: pedicels shorter than the calyx.

P. Pringlei Gray Proc. Am. Acad. xvii, 223. Stem slender, 2-6 inches high from an annual root, glandular and pubescent: leaves linear-lanceolate, entire, tapering at base, obscurely petioled, only the uppermost alternate: calyx-lobes linear, 3 lines long, about half as long as the very open-campanulate blue corolla, longer than the globose capsule: seeds angled and not hollowed ventrally. On the mountains of southern Oregon and northern California.

* Pubescence or some of it hispid or hirsute: spikes or branches of the cyme scorpioid and dense: pedicels short or hardly any: appendages of the corolla broad and salient, usually more or less united at the base of the filaments.

† Leaves all simple and entire, or some of the lower pinnately 3-5-parted or divided; the segments or leaflets entire: capsule ovate, acute: seeds densely alveolate-punctate, the upper end acutish.

P. nemoralis Greene Pitt. i, 141. Perennial, often flowering the first year from seed, 2-6 feet high stout, loosely branching; hispid throughout and destitute of canescent pubescence: leaves simple and entire or the lower ones more or less lobed or parted at the base, ovate-oblong, 2-6 inches long, petiolate, rugose and without conspicuous parallel veins; racemes geminate, short and spreading, slender but not loose: corolla small, greenish-yellow: stamens exserted: fruiting calyx round-ovate or nearly globose; the oblanceolate calyx-lobes spreading away from the capsule below, connivent over it above: seeds 2, (the other 2 ovules always abortive,) ovate, acutish, deeply pitted, dark brown. In rich alluvial soil, Washington to California.

P. mutabilis Greene Erythea iv, 55. "Biennial, erect, slender, 10 to 18 inches high, not much branched, sparingly leafy, the radical leaves few and ascending, not forming a depressed tuft, sparsely hirsute throughout, and with a short somewhat villous pubescence beneath the hirsute: leaves of thin texture, mostly entire and simple, elliptic, acute, some of the radical with a pair of pinnae at the summit of the slender petiole: ra-

comes several, terminal and subterminal: corolla nearly cylindrical, either deep purple or ochroleucous: mature calyx-segments narrowly oblanceolate, or some of them more dilated at summit, hispid with spreading hairs, without finer pubescence: capsule small, ovate, acuminate mostly 4-seeded. In rich moist soil, southeastern Oregon and adjacent California.

P. heterophylla Pursh Fl 140. *P. circinata*, Jacq. ? Hispid and the foliage canescent: stem stout, 6-24 inches high from a perennial root: leaves from lanceolate to ovate, acute, pinnately and obliquely striate-veined, the lower tapering into a petiole and commonly some of them with 1 or 2 pairs of small lateral leaflets: inflorescence hispid; the dense spikes thyrsoid-congested: corolla bluish, longer than the oblong-lanceolate or linear calyx-lobes: filaments much exerted, sparingly bearded. Dry grounds and rocky ridges, Brit. Columbia to California.

P. virgata Greene Erythra iv, 54. Hispid and the foliage strigose: stem usually solitary, erect and strict, simple, 1-2 feet high from an annual or biennial root: leaves pinnate or the upper ones simple and entire, leaflets lanceolate, acute or acuminate, 6-12 lines long, strongly pinnae-veined: flowers in dense glomerules in a long virgate spike or thyrsus; inflorescence hispid; sepals oblong-lanceolate, corolla white or yellowish, little exceeding the calyx; filaments long exerted, often curved or twisted, pubescent. Dry ground, southwestern Oregon.

P. leucophylla Torr. Frem. Rep. 95. Perennial by a stout rootstock, pale, densely silky-pubescent, the hairs appressed or ascending: stems simple or branched, 12-18 inches high: leaves lanceolate to oblong, entire, pinnately veined, 2-4 inches long, 4-12 lines wide, the lower long-petioled, the upper sessile or nearly so; spike-like branches of the scorpioid cymes very dense, nearly straight and 1-3 inches long when expanded: flowers sessile, very numerous, about 4 lines high: calyx-lobes hispid, oblong-lanceolate or linear, somewhat shorter than the white or bluish, 5-lobed corolla; corolla-appendages conspicuous, in pairs between the filaments; stamens exerted glabrous; ovules 2 on each placenta; capsule ovoid: In dry soil, Idaho to Dakota and Nebraska.

P. humilis T. & G. Pac. R. Rep ii, 122. Pubescent or the inflorescence often hirsute: stem 8-10 inches high from an annual root, diffusely branched from the base: leaves spatulate-oblong or oblanceolate, rather obtuse; the lower rarely with 1 or 2 lateral ascending lobes, the veins branching: spikes loosely paniculate or solitary, in age rather slender: pedicels either all very short, or the lower sometimes almost as long as the calyx: corolla indigo-blue, rather deeply lobed, surpassing the linear calyx-lobes: filaments moderately exerted, glabrous or sparingly bearded above: capsule ovate, acute, $1\frac{1}{2}$ lines long, 4-seeded: seeds a line long, minutely pitted. Eastern Oregon to Nevada and California.

++ Leaves simple, all petioled rounded-cordate, somewhat palmately lobed or incised, the lobes serrate.

P. malviflora Cham. Linn. iv, 494. Rather tall and stout, hispid with spreading or reflexed bristles and the foliage more or less pubescent: leaves green and membranaceous, round-cordate, incisedly 5-9-lobed, acutely toothed, somewhat palmately ribbed at base: flowering spikes solitary or geminate, an inch long: corolla 3-4 lines long, white, longer than the unequal linear and spatulate calyx-lobes: stamens exerted: seeds alveolate-scabrous. Along the coast, southern Oregon and California.

P. Rattani Gray Syn. Fl. Supp. 413. Hispid with slender stinging bristles throughout: root annual: stem slender and weak, 6-18 inches high: leaves oval to oblong-ovate, with truncate or barely subcordate base, incisedly somewhat lobed and crenate, only the lower palmately veined at

base: spikes slender of 4 spatulate whitish: stamens placed along str

+ + + I nately compo

P. ramosiss branching, 1-3 leaves pubescent or incisedly divided, dense, but little on the rachis: cymes niform, but little truncate free apically, much shorter. On rocky hills and

P. ciliata B. stem erect or ascending, leaves 1-3 inches merely cleft; the short and in fruit calyx-lobes from the cleft, in age, the corolla but little near the base of the mucronate, half as long as the stem. Oregon to C

§ EUTOCA campanulate capsule. Capsule ovate or globose, the testa areolate, rugose.

P. Bolanderi bristles, also viscidial root, stout, and lower cauline small and incisedly lobed or oval, calyx-lobes hispid, nearly rotate with appendages semi-cylindrical in front of the lobes, about equalling the lobes: capsule broad, each dilated part

P. procera perennial root, erect, the simple stem pubescent, 2-5 inches high, minutely cleft, or bifid cymes, minutely lobed, appendages united, inserted: anthers

base: spikes slender, often solitary, short and rather loosely flowered: calyx of 4 spatulate and 1 larger obovate sepal: corolla obovate 2 lines long, whitish: stamens and style included; seeds small, alveolate. In shady places along streams, southern Oregon to California.

+ + + Leaves from simple and pinnately dentate or lobed to pinnately compound: flowers crowded in the scorpioid spikes.

P. ramosissima Dougl. Hook. Fl. ii, 80. Stems rather stout and branching, 1-3 feet long, spreading or ascending from a perennial root, leaves pubescent, 5-9-lobed or divided into oblong or narrower pinnatifid or incised divisions: inflorescence hispid; spikes glomerate, short and dense, but little elongated in age: flowers subsessile and in fruit ascending on the rachis: calyx-lobes entire, linear-spatulate to obovate: corolla funnel-form, but little exceeding the calyx; the appendages within with a truncate free apex: filaments exerted, glabrous: capsule ovate or short-ovoid, much shorter than the calyx; seeds oblong, rounded on the back. On rocky hills and banks, eastern Oregon and Washington to California.

P. ciliata Benth. Linn. Trans. xvii, 280. More or less pubescent: stem erect or ascending, scabrous, 3-12 inches high, from an annual root: leaves 1-3 inches long, pinnately parted or the lower divided and the upper merely cleft; the oblong divisions or lobes pinnatifid-incised: spikes rather short and in fruit rather loose: pedicels short or hardly any ascending: calyx-lobes from lanceolate to ovate, accrescent and becoming venose-reticulated in age, then sparingly ciliate with short rigid bristles, 4-5 lines long: corolla but little surpassing the calyx, its appendages short and broad, near the base of the tube: filaments not exceeding the corolla: capsule ovate, mucronate, half as long as the fruiting calyx: seeds oval smoothish. Eastern Oregon to California.

§ *EUTOCA* Gray Man. ed. 2, 329. Appendages of the mostly campanulate corolla in the form of 10 vertical salient lamellæ. Capsule ovate or oblong. Ovules and seeds 6-50 on each placenta; the testa areolate-reticulated or favose-pitted, but not transversely rugose.

P. Bolanderi Gray Proc. Am. Acad. x, 322. Hispid with slender bristles, also viscid-pubescent, especially above: stems several, from a perennial root, stout, erect or ascending, 1-2 feet high, freely branching: radical and lower cauline leaves lyrate, and oblong in outline, with 1 or 2 pairs of small and incised lateral divisions: the terminal division and upper leaves ovate or oval, coarsely incised or lobed, truncate or subcordate at base: calyx-lobes hispid, at length spatulate, 3 or in fruit 4 lines long: corolla nearly rotate when expanded, 8-12 lines in diameter, white or blue; its appendages semi-ovate, almost as broad as long, distinctly connected at base in front of the adnate and sparingly bearded filaments: stamens about equalling the corolla; anthers oblong: style cleft nearly to the middle: capsule broadly ovate, acute, shorter than the calyx: seeds about 50 on each dilated placenta. Southern Oregon to California, near the coast.

P. procera Gray Proc. Am. Acad. x, 323. Stems several from a perennial root, erect, 3-7 feet high, minutely soft-pubescent; the summit of the simple stems glandular but not hispid: leaves green and membranous, 2-5 inches long, ovate-lanceolate and ovate, acute, mostly laciniate-pinnatifid or cleft: the lobes 2 to 4 pairs and acute: spikes of the glomerate or bifid cyme somewhat lengthened in age: calyx-lobes oblong-lanceolate, minutely hispid: corolla ochroleucous, the semi-cordate oblique appendages united over the base of the sparsely bearded filament: stamens exerted: anthers oblong, style 2 cleft above the middle: capsule globular-

ovate, hardly mucronate: seeds 10-18, wing-angled. In the high mountains of Brit. Columbia to California.

P. sericea Gray Am. Jour. Sci. ser. 2, xxxiv, 234. Stems 8-12 inches high from a branching perennial caudex, silky-pubescent or canescent or the simple virgate stems and inflorescence villous-hirsute. leafy to the top: leaves pinnately parted into linear or narrow-oblong numerous and often again few-cleft or pinnatifid divisions, silky-canescens or sometime greenish: the lower petioled; the uppermost simpler and nearly sessile: short spikes crowded in a naked spike-like thyrsus: calyx-lobes linear, minutely hispid: corolla blue or whitish, very open-campanulate, cleft to the middle, marcescent-persistent; its appendages oblong, vertical, wholly free from the filaments: stamens long-exserted; anthers short-oval: style 2-cleft at the apex: capsule ovate, short-acuminate, a little longer than the calyx and marcescent corolla, 12-18 seeded: seeds ovate-oblong, terete, acutish, longitudinally costate and transversely alveolate-reticulated. On high mountains, Oregon and Washington to the Arctic regions and the Rocky Mountains.

P. Franklinii Gray Man. ed. 2, 329. Villous-pubescent throughout: stem erect, 6-18 inches high, from an annual root, simple or corymbosely branched at the summit: leaves $1\frac{1}{2}$ -3 inches long, pinnately parted into 7-15 linear or linear-oblong acute entire dentate or incised segments: flowers blue to nearly white, short pediceled, in dense scorpioid racemes: calyx-lobes linear-lanceolate, acute, longer than the tube of the rotate-campanulate corolla: appendages of the corolla long and narrow, free at the apex, and at base free from the filaments: stamens about as long as the corolla; anthers short: style 2-cleft at the apex: capsule ovate, acute, about equalling the calyx, seeds numerous, oval, minutely alveolate in vertical lines. Along the Snake river southwestern Idaho to Lake Superior.

P. Menziesii Torr. Watson Bot. King 252. Hispid or roughish-hirsute, and usually cinereous-pubescent also: stem erect, 4-12 inches high from an annual root, at length paniculately branched: leaves mostly sessile, linear-lanceolate, entire or some of them deeply cleft; the lobes few or single, linear or lanceolate entire: spikes or spike like racemes thyrsoid-paniculate, at length elongated and erect: calyx-lobes linear, hispid-ciliate, 4-5 lines long: corolla blue varying to white, rotate-campanulate, 6-10 lines in diameter; its appendages connivent in pairs opposite the lobes, forming 5 nectariferous grooves: alternate stamens shorter than the corolla: style 2-cleft at the apex: capsule ovate, acuminate, about half the length of the calyx: ovules 12-16: seeds oblong coarsely favose-reticulated. Common in dry grounds, Oregon and Washington to California, Brit. Columbia and Montana.

P. verna Howell Erythra iii, 35. Soft-pubescent and cinereous: stem 4-10 inches high from an annual root, paniculately branched: leaves obovate to spatulate, entire or rarely some of the lower ones incisely toothed, abruptly contracted below to a winged petiole, or the upper ones sessile: corolla pale blue, but little exceeding the calyx, open-campanulate, cleft to the middle, its appendages broad and free from the filaments; calyx-lobes linear-lanceolate, 2-3 lines long, hirsute: stamens exserted, anthers oval: style deeply 2-cleft, hispidulous: capsule ovoid, acuminate, more than half the length of the calyx; seeds 8-12, oblong to obovate, favose-pitted. On rocky ridges in the Umpqua Valley, Oregon.

§ 3 MICROGENETES B. & H. Gen. ii 828. Low annuals with mostly pinnatifid leaves. Appendages in the corolla present or rarely wanting. Style 2-cleft only at the apex. Stamens unequal, not exserted. Ovules several on each placenta. Seeds oblong, strongly corrugated transversely.

P. Ivesiana Torr. Bot. Ives 21. Hirsute-pubescent and glandular:

stem 6-10 inches high, parted into 7-15 rarely bipinnatifid ciliate, 2 lines long: calyx, its appendages narrow: style hardly corrugated. Dr. and Utah.

P. bicolor Torr. 6-8 inches high, divisions again irregularly spiciform, loosely linear-spatulate, 2-3 lines long, with appendages long and narrow: filament forming a seeds about 16; from Nevada and California.

4 EMM

Low annual l and yellow flow the sinuses naked appendage persistent base of the corolla Nectary or disk thick, free or ad oblong, compressed axis, many ovules stigmas capitellate. Seeds 2-20 dependent.

E. parviflora and viscid; depressed short spikes or rarely 2-3 lines long, mer late calyx-lobes, within furnished with ovary, persistent: Oregon.

E. lutea Gray fine pubescence, branched from the subpinnately parted long: flowers coming 3 lines long lobed, equalling within furnished with than the ovary, per mes long acutish agose. Southeast

E. pusilla Gray high, at length diffuse or nearly so,

stem 6-10 inches high, diffusely branched from the base: leaves pinnately parted into 7-15 linear or oblong and entire or incised few-toothed lobes rarely bipinnatifid: racemes loose, 6-20 flowered: sepals linear, minutely ciliate, 2 lines long: corolla white or pale purple, slightly longer than the calyx, its appendages adnate to the filaments only at base, vertical, long and narrow: style hairy below: capsule oblong, 16-24-seeded: seeds strongly corrugated. Dry plains eastern Oregon and Washington to California and Utah.

P. bicolor Torr. Watson Bot. King 255. Viscid-puberulent: stem 6-8 inches high, diffusely much branched: leaves pinnately parted and the divisions again irregularly pinnatifid into small nearly linear lobes: racemes spiciform, loosely 10-20-flowered: calyx divided to the base, the lobes linear-spatulate, 3-4 lines long, often unequal: corolla nearly funnel-form, 6-8 lines long, with violet lobes yellow throat and white tube: its appendages long and narrow, united for more than half their length: the filament forming a long tubular cavity behind it: capsule ovoid-oblong: seeds about 16; minutely corrugated. Under Junipers, southern Oregon to Nevada and California.

4 EMMENANTHE Benth. Trans. Linn. Soc. xv

Low annual herbs with alternate, pinnatifid or entire leaves and yellow flowers in simple circinate racemes. Calyx 5-parted, the sinuses naked. Corolla yellow, campanulate, 5-cleft, without appendage persistent. Stamens included, inserted at the very base of the corolla, with slender filaments and elliptic anthers. Nectary or disk annular, surrounding the base of the ovary, rather thick, free or adnate to the base of the corolla. Ovary ovoid or oblong, compressed, 2-celled, by the union of the placentae in the axis, many-ovuled: style 2-lobed at the summit, subsistent: stigmas capitate. Capsule ovoid or oblong, incompletely 2-celled. Seeds 2-20 reticulated, or pitted and transversely rugose, pendent.

E. parviflora Gray Pac. R. Rep. iv, 85, t. 15. Densely pubescent and viscid; depressed annual: leaves deeply pinnatifid: flowers crowded in short spikes or racemes, on very short pedicels: corolla bright yellow, 3-3 lines long, merely 5-lobed, not longer than the linear obscurely spatulate calyx-lobes, withering persistent and enclosing the capsule; the tube within furnished with 10 narrow appendages: style hardly longer than the ovary, persistent: ovules 20-40; seeds 15-20. Shores of Klamath Lake Oregon.

E. lutea Gray Proc. Am. Acad. x, 328. Somewhat canescent with a fine pubescence, and viscid above: stem ascending or depressed, much branched from the base: leaves oblong in outline, 1-2 inches long, petioled, bipinnately parted, the 5-9 lobes entire, oblong or obovate, 1-3 lines long: flowers crowded, on very short pedicels: sepals linear, obtuse, becoming 3 lines long: corolla bright yellow, narrowly campanulate, merely 5-lobed, equalling the calyx, persistent at the base of the capsule, the tube within furnished with 10 narrow appendages: style filiform, much longer than the ovary, persistent: ovary densely hairy, about 11-ovuled: capsule 3 lines long acutish, 8-10-seeded: seeds oblong, finely reticulated as well as rugose. Southeastern Oregon to Nevada and California.

E. pusilla Gray Proc. Am. Acad. xi, 87. Pubescent: stem 1-2 inches high, at length diffusely branched: leaves spatulate or oblong-lanceolate, entire or nearly so, 2-5 inches long, tapering into a petiole of equal length:



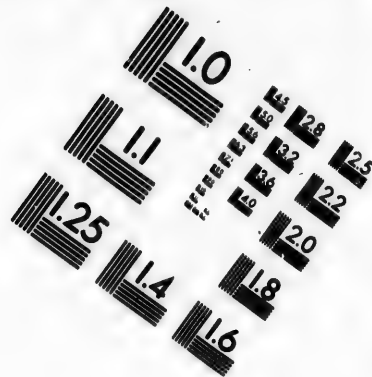
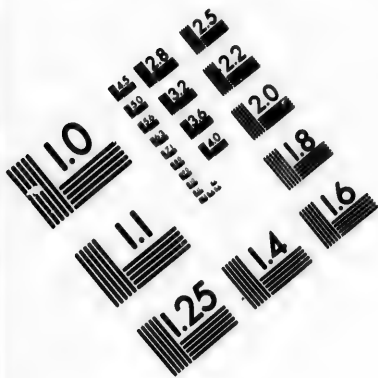
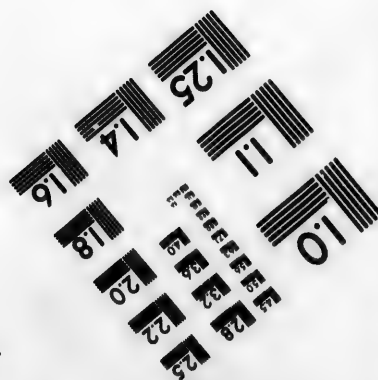
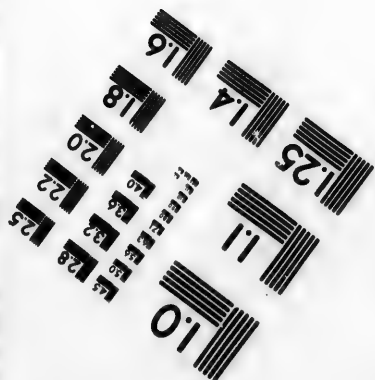
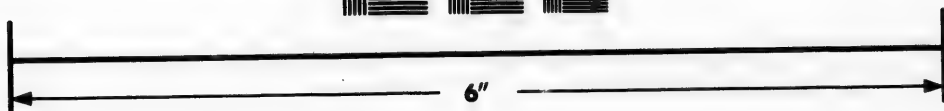
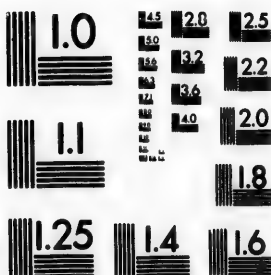


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peduncles slender, loosely and racemously 3-7-flowered, the earliest ones scapiform; pedicels spreading; corolla nearly white, 5-cleft, short-campanulate, about half as long as the linear obscurely spatulate calyx-lobes and of the ovoid very blunt capsule, persistent, its internal appendages not manifest; style very short, at length deciduous; capsule 8-10-seeded, Southeastern Oregon to Nevada.

5 CONANTHUS Torr. Watson Bot. King 256.

Low annuals with entire leaves and solitary flowers in the forks of leafy branches. Calyx 5-parted, the sinuses naked and the lobes not enlarged in fruit. Corolla tubular-funnelform, with a broad, 5-lobed limb, and no appendages within. Stamens included, unequal and unequally inserted on the middle of the corolla-tube. Nectary or disk none. Ovary 2-celled, rather many-ovuled. Style 2-lobed at the summit. Capsule rounded-ovate 10-20-seeded. Seeds ovate or oblong, smooth.

C. aretioides Watson Bot. King 256. Hispid-hirsute throughout: small and depressed winter annual 2-3 inches high, repeatedly forked from the very base, forming mats or tufts: leaves linear-spatulate, narrowed below to a petiole: flowers comparatively large and numerous, sessile in the forks, fully 6 lines long: calyx-filiform-linear, hispid with long spreading hairs: corolla purple, funnelform with rather long narrow tube and ample limb: style 2-lobed at the summit: ovules about 20: seeds usually fewer, the testa thin and translucent, smooth or in age sparsely and obscurely excavated. Southeastern Oregon to Nevada, Arizona and California.

6 ROMANZOFFIA Cham. in Hor. Phys. Berol. 71, t 14.

Perennial herbs with alternate or chiefly radical, round, reniform or cordate, crenately lobed, long-petioled leaves, and showy flowers in loose racemes or somewhat paniculate. Sepals or calyx-lobes all alike. Corolla funnelform or almost campanulate: the stamens inserted on the base of its tube, unequal. Style and small stigma entire. Inflorescence scapiform, loosely racemose. Ovary 2-celled or nearly so, the placentae narrowly linear. Capsule oblong, retuse, many-seeded. Seeds oval, the testa alveolate-reticulated.

R. Hitchensis Bongard Veg. Sitk. 41 t. 4. Slightly and sparsely pubescent or glabrate: stems slender, scape-like, spreading or ascending, 4-10 inches long: leaves round-reniform, 3-7-lobed, an inch or less in diameter, on slender petioles 1-4 inches long, the bases of which often enlarge and become bulblets: flowers white, in a loose terminal raceme: pedicels filiform, becoming an inch or more long: calyx-lobes very glabrous, subulate, about 2 lines long: corolla funnelform, 6-8 lines long, 5-lobed, the broad lobes rounded at the summit: style long and slender: capsule longer than the calyx. On wet banks, California to Alaska west of the Cascade Mountains.

6 CAPNOREA Raf. Fl. Tellur. iii, 75.

HESPEROCHIRON Watson.

Low stemless perennials with entire spatulate or oblong leaves on mostly elongated margined petioles crowning the caudex or root-stock, and from their axils sending up naked 1-flowered peduncles

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Shrubby plan

equalling or shorter than the leaves. Calyx 5-parted, rarely 6- or 7-parted; the lobes linear-lanceolate, occasionally unequal. Corolla campanulate or rotate deciduous the stamens inserted on the base of its tube. Style 2-cleft at the apex. Disk none. Ovary 1-celled: the narrow placentae projecting more or less on incomplete half-dissepiments: ovules 20 or more on each placenta. Capsule loculicidal, 15-20-seeded. Seeds pretty large with a somewhat fleshy minutely reticulated testa.

C. nana Raf. l. c. *Hesperochiron Californicus* Watson. Leaves numerous in a rosulate radical tuft, broadly lanceolate, 1-3 inches long, densely tomentose both sides, contracted below to a broad petiole: peduncles slender, shorter than the leaves, pubescent, recurved in fruit: calyx-lobes linear, 3-4 lines long, densely pubescent; corolla campanulate, 6-8 lines long, hairy within; its lobes shorter than the tube. On wet banks and springy places, eastern Washington to California and Utah.

C. pumila Greene Erythra ii, 193. *Hesperochiron pumilus* Porter. Leaves several from the crown of a short usually branching rootstock, lanceolate to spatulate, tapering below to a slender petiole, minutely ciliate, otherwise glabrous: peduncles slender, 1-3 inches long, about equalling the leaves, glabrous: sepals lanceolate, about 6 lines long, minutely ciliate: corolla white to purple, rotate, often an inch broad; its broad ovate lobes longer than the tube; the tube within and base of the filaments pubescent. In wet places, eastern Washington to California and Idaho.

Tribe 3 Namæ B. & H. Gen. ii, 826. Leaves simple, alternate or sometimes imperfectly opposite. Corolla imbricated in the bud, not appendaged within. Style 2-parted, the tips or stigmas commonly thickened or capitate. Ovary completely or incompletely 2-celled. Capsule loculicidal; the valves bearing the half dissepiments on their middle. Seeds with firm-fleshy albumen.

8 NAMA L. Gen. n. 317.

Low herbs or suffrutescent plants of various habits.: ours low annuals with entire leaves and the flowers terminal or lateral or in the forks of the stem. Corolla funnelform or somewhat salverform. Filaments and style filiform, more or less included. Stamens commonly unequal and more or less unequally inserted. Ovules numerous on the transverse lamelliform placentæ which approximate or cohere in the axis of the ovary but separate in the loculicidal dehiscence and are borne on the half-dissepiments or half-valves of the capsule. Capsule membranaceous, the valves and placentae undivided. Seeds usually numerous.

N. demissum Gray Proc. Am. Acad. viii, 283. Hirsute-pubescent to scabrid: stems diffuse or depressed, 2-4 inches long, dichotomously branched: leaves linear-spatulate, 6-15 lines long, all or most of them tapering into a petiole: flowers subsessile in the forks: sepals linear or setaceous, 4 lines long: corolla purple, narrow-funnelform, about 6 lines long: capsule short-oblong, 16-seeded: seeds oval or oblong. Dry interior regions, Washington to California, Utah and Arizona.

9 ERIODICTYON Benth. Bot. Sulph. 35

Shrubby plants with alternate pinnately veined and finely re-

ticulated leaves and violet purple or white flowers in scorpioid cymes. Sepals narrow, not enlarging upward. Corolla funnel-form or approaching campanulate. Filaments more or less included, inserted on the tube and more or less adnate to it, usually sparsely hirsute. Ovary nearly or completely 2-celled by the meeting of the dilated placentae in the axis. Capsule small, crustaceous, 4-valved, that is first loculicidal then septicidal thus splitting into 4 half-carpels which are closed on one side owing to the widely dilated placentae, and partly open on the other. Seeds rather few, pendulous.

E. glutinosum Benth. 1. c. Glabrous, and glutinous with a balsamic resin: stems erect, 3-5 feet high: leaves lanceolate, 3-6 inches long, irregularly more or less serrate, sometimes entire, whitened beneath between the reticulation by a mirute and close tomentum, dark green and glabrous above, persistent for more than a year: flowers purple, numerous, in elongated naked thyrsoid cymes: sepals subulate, 2 lines long, sparsely hirsute: corolla 6 lines long, tubular-funnelform, sparsely hairy: capsule globose-ovate, pointed; 3 lines long. On dry open hillsides, southern Oregon to California.

ORDER LXV. BORAGINACEÆ Lindl. Nat. Syst. ed. 2, 274.

Mostly scabrous or hispid-hairy plants with bland watery juice, mostly alternate entire leaves without stipules and rather small regular flowers in scorpioid racemes spikes or cymes. Flowers perfect, generally 5-merous. Calyx free from the ovary, usually persistent. Corolla gamopetalous, mostly regular and 5-lobed, sometimes crested or appendaged in the throat. Hypogynous disk usually present but inconspicuous. Stamens inserted on the throat or tube of the corolla, as many as and alternate with its lobes. Style simple, rising between the divisions of a deeply 4-parted ovary, or from the summit of an undivided one. Ovary of 2 biovuled entire or more commonly deeply 2-lobed carpels, making it appear like 4 1-ovuled carpels. Ovules anatropous or amphitropous. Fruit 4, or by abortion fewer, nutlets, or a drupe containing 2-4 nutlets or rarely reduced to one. Seeds with little or no albumen and straight or curved embryo with superior or centripetal radical.

I Ovary undivided and surmounted by the style.

TRIBE I Low herbs shrubs or trees. Style once forked: the branches tipped with a simple stigma.

Coldenia Corolla-lobes imbricated or partly convolute in the bud: style simply and deeply 2-cleft: fruit separating into 4 dry carpels.

TRIBE II Herbs or sometimes shrubby plants. Style terminal sometimes very short or none, entire. Stigma a fleshy ring, or margin of a disk, often surmounted by a mostly conical appendage.

2 **Heliotropium** Corolla-lobes imbricated in the bud with the sinuses plane: fruit splitting into 4 one-seeded or 2 two-celled and 2-seeded carpels.

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